Holly Springs Pedestrian Transportation Plan

April 2007




Division of Bicycle & Pedestrian Transportation

GREENWAYS INCORPORATED

Landscape Architecture
Multi-Objective Trail Planning
Open Space Planning

Vision Statement

To promote a pedestrian-friendly environment; where connectivity is improved within and outside Town, sidewalks and greenways are further developed and integrated, and all users are offered increased accessibility, convenience, and safety.

Acknowledgements

Figure a: It is important to not only provide different types of walking opportunities, such as the Middle Creek Greenway shown here, but to also link these trails with surrounding neighborhoods and communities.

This Pedestrian Transportation Plan was made possible through the hard work and dedication offered by a joint effort of the Town staff, North Carolina Department of Transportation (NCDOT), CAMPO, and citizens of Holly Springs. It was funded through the bicycle and pedestrian planning grant initiative of the NCDOT. These public-private partnerships represent the very best in community based design and planning efforts and highlight the commitment of the Holly Springs citizens and officials towards planning for, building, and celebrating a walkable and pedestrian friendly community.

Committee Members:

Holly Springs Department of Engineering:
- Darin Eyster, Project Coordinator
- Kendra Stephenson, Senior Engineer

Holly Springs Department of Planning:
- Jeff Jones, Planner II

Holly Springs Department of Parks and Recreation:
- Len Bradley, Parks and Recreation Director
- Scott Barnard, Bass Lake Park Manager

Town Council:
- Vinnie Debenedetto, Councilman

NCDOT Transportation Planning Branch, Division of Bicycle and Pedestrian Transportation
- Bob Mosher
- Sarah Smith

CAMPO
- Jake Petrosky
- Kenneth Withrow,
- Diane Wilson

Steering Committee Members:

- Alan Patterson, Parks and Rec. Advisory Committee
- Sheila Schilling
- Mary Elizabeth Bassett
- Patrice Alexander
- Barb Koblich
- Betty Deese
- Tim Sack

Consultant:

Greenways Incorporated:
- Matt Hayes, Project Manager
- Jason Reyes, Planner
- Leslie Clark, Planner
- Ben Monette, Urban Designer

Table of Contents

Chapter 1
Introduction

Chapter 2
Existing Conditions

Chapter 3
Pedestrian Network

Chapter 4
Programs and Policies

Chapter 5
Implementation

Chapter 6
Design Guidelines

Appendix A
Public Input

Appendix B
Prioritization Matrix

Appendix C
Cost Estimates

Appendix D
Funding

Appendix E
Glossary

Figure b: The Village District is an important connection and destination within a successful pedestrian friendly environment in Holly Springs.

List of Maps

Chapter 2
Map 2.1: Existing Conditions
Map 2.2: Current Land Use

Chapter 3
Map 3.1: Pedestrian Network

Appendix B
Map B.1: On-road Prioritization
Map B.2: Greenway Prioritization

Introduction 1

1.0 Scope and Purpose

Holly Springs, North Carolina is a rapidly growing community due to its proximity to Raleigh and the Research Triangle Park (RTP). A town of 1,000 people in 1990, the population grew to more than 9,000 in 2000 and sits at over 18,000 people in 2006. This tremendous growth has meant many changes for Holly Springs with rapidly increased residential and facility development. The Town of Holly Springs faces the challenge of promoting sustainable growth, providing necessary resources to new residents, while still striving to keep its strong "small community feel." The development of a Pedestrian Plan comes at the right time to help guide Holly Springs in providing a safe, connected, pedestrian-friendly community.

Figure 1(a): The Village District is the central focus point in the Town of Holly Springs and is an important pedestrian hub.

The planning study area covers the Holly Springs corporate limits and the ETJ which encompasses about 15 square miles. Because the Town is expanding outwards, it is important to maintain and develop a connected pedestrian network keeping transportation and recreational trips possible by foot. While the Town is still relatively small, connectivity of pedestrian facilities is still an achievable goal when building upon the existing pedestrian facilities.

While walking is the least expensive and for some, the only transportation mode, implementing, building, and maintaining a high quality pedestrian system requires comprehensive planning and long term funding. This Pedestrian Transportation Plan will be a key resource for the Town in securing grants from a growing supply of funds dedicated to pedestrian safety and livable communities.

The Plan seeks to address retrofitting pedestrian facilities where connectivity is lacking and also provide sound policy and ordinance recommendations to ensure future pedestrian-friendly growth. It addresses all users from children to seniors and seeks to provide pedestrian accessibility to multiple land uses including schools, residential areas, commercial areas, trip attractors, and Downtown.

This document presents the findings of a public input process along with an assessment of existing pedestrian facilities in Holly Springs. From these findings, a set of phased recommendations have been developed for a pedestrian system that meets the future needs of area's residents. These recommendations include an integration of both on-road and off-road pedestrian facilities along with improved roadway crossings. The recommendations include both physical changes and policy changes to help guide pedestrian-friendly growth. The Plan also provides program recommendations to promote walking and funding sources to facilitate the Plan's implementation.

1.1 Benefits of a Walkable Holly Springs

Figure 1(b): Walking has many proven benefits. A comfortable, aesthetically pleasing, and functional pedestrian system will promote walking as an important health and wellness activity in Holly Springs.

Communities across the United States have been implementing strategies to improve their walking environments and serve the needs of pedestrians. This is done not only to promote public safety, health and welfare, but also because of the growing awareness of the multiple benefits of walking. These benefits include alternative transportation options, increased health and fitness, lower levels of traffic congestion, environmental benefits, economic benefits, and an increased sense of community among residents.

Transportation Benefits

Walking is the most inexpensive and broadly accessible form of transportation. People engage in multiple walking trips everyday, mostly by necessity, to get from place to place. In 1995, the National Personal Transportation Survey found that roughly 40% of all trips taken are less than 2 miles. By making these short trips on foot, rather than a car, citizens can have a substantial impact on local traffic and congestion. Additionally, many people do not have access to a vehicle or license and simply cannot afford other modes of transportation. In an auto-dependent environment, this situation leaves the elderly, the young, and the underprivileged without a means to get around for even basic daily trips. An improved pedestrian network provides greater and safer mobility for all residents, and allows for equity and a more productive community overall.

Increasingly, citizens believe that access to alternative means of transportation and access to quality recreational opportunities such as parks, trails, greenways, and bicycle routes, are important factors for them in determining their overall pleasure with their community. Walkable places can help build a sense of community as well by encouraging residents to get outside and increase

social interaction. Sidewalks and greenways ideally function as positive places to meet, play, live, work, and shop. Happy, active citizens radiate a high degree of livability within a community and this livability factor can, as mentioned above, attract new businesses, new residents, and new opportunities - all important components of maintaining a high quality of life in the community.

Personal Health

It is well documented that an active community is a healthy community. There are numerous studies affirming that sedentary lives and prolonged periods of inactivity are major deterrents to health, sometimes doubling the risk of morbidity and mortality from coronary heart disease and stroke[1]. Obesity and diabetes, particularly in children, have risen dramatically in recent years. In fact, the U.S. has obesity prevalence rates of 20% or greater[2]. The U.S. Department of Health now recommends 60 minutes of physical activity every day to maintain body weight. Improving the connections between schools and neighborhoods in the Town of Holly Springs can positively influence children's health by providing opportunities to further incorporate exercise into their daily lives.

Figure 1(c): Pedestrian-friendly area in front of Town Hall.

Overall, the rise in the occurrence of obesity, cardiovascular disease, hypertension, diabetes, osteoporosis and some cancers affecting all ages are clearly linked to lack of physical activity. A safe, walkable community provides a means and facility to pursue exercise and improve health for all.

Environmental Improvements

Having adequate pedestrian facilities helps to reduce dependence on automobile travel which improves air quality. When people choose to get out of their cars and make trips by foot, they make a positive environmental impact. They reduce their use and dependence on gasoline and reduce the volume of air pollutants. According to the EPA there is strong evidence that reducing air pollution from automobile use can protect children's health[3]. For example, during the 1996 Atlanta Olympic Games, when driving was reduced and ambient ozone levels fell by 27.9 percent, emergency room visits for asthma dropped by 41.6 percent. These results suggest that while pedestrians are improving their own health through physical activity, they are also improving the health of those around them by not contributing to air pollution with their automobile trips. Other impacts can be a reduction in overall neighborhood noise levels and improvements in local water quality as fewer automobile-related discharges wind up in the local rivers, streams, and lakes.

Greenways help protect and preserve important natural landscapes, linking fragmented habitats and providing wildlife corridors. They enhance water quality by providing natural buffer zones that protect water bodies from runoff. Air quality is improved by protecting the plants that naturally create oxygen and filter out air pollutants. They also encourage interaction between humans and their environment and provide a means for environmental education.

Economic Benefits

A pedestrian friendly city can help both the individual and the community economically. Walking is a free means of transportation. The cost of owning and operating a car with surging gas prices is a significant percentage of our incomes. Walking is a necessity for some and a financial gain for all. A walkable community is also a sign of high quality of life, attracting new residents and businesses, and spurring economic development.

Figure 1(d): By protecting natural landscapes, wildlife populations will flourish. Shown here, a frog searches for cover along the Middle Creek Greenway, near residential construction.

Summary and Additional Resources

Many private and public organizations have completed studies and surveys that show the many benefits of walking. The ideas presented above are only a small sample of the information that is available. If you would like to learn more about the benefits of walking, the Internet can be a great source of information. An excellent starting-point for resources is the Pedestrian and Bicycle Information Center's website (www.walkinginfo.org/pp/benefits), based out of Chapel Hill, NC. Another excellent resource is Active Living by Design, (www.activelivingbydesign.org), a program of the Robert Wood Johnson Foundation and part of the UNC School of Public Health, also in Chapel Hill, NC.

1.2 Goals and Objectives

The following goals and objectives were generated for the Town of Holly Springs in 2006 from Steering Committee representatives and public participants. These goals provided an overall guide for developing the Pedestrian Plan. They are a combination of overall goals for the Town of Holly Springs and for the Pedestrian Plan itself. Taken together, they helped to form the vision statement.

- Improve connectivity across Town by filling sidewalk gaps and connecting different land uses through an integrated combination of sidewalks, greenways, and safe roadway crossings

- Promote safe walking in Holly Springs for all types of residents and promote the safe interaction between motorists and pedestrians
- Focus on improving pedestrian safety near schools, commercial areas, major corridors, and Downtown
- Develop off-road greenways that protect the environment, provide recreational opportunities, and connect into the on-road sidewalk system
- Improve unsafe intersections and crossings
- Integrate pedestrian network with surrounding communities and regional trail systems
- Provide for senior and disabled accessibility
- Determine key pedestrian issues in Holly Springs
- Prioritize pedestrian needs and projects
- Develop a Plan that is integrated with other existing and future Town of Holly Springs plans
- Develop policies and ordinances to guide pedestrian-friendly growth
- Provide funding opportunities to guide Holly Springs in future implementation

Figure 1(e): Citizen participation at one of two public workshops.

1.3 Plan Components

This Plan document includes the following major components:

This Introduction that presents the mission, goals, planning process, and guiding principles of this Plan along with the benefits of a walkable town (Chapter 1).

An assessment of Existing Conditions that overviews existing pedestrian conditions, land use, trip attractors, and also summarizes existing related plans of Holly Springs (Chapter 2).

A recommended Pedestrian Network that puts forward a framework of recommended facilities (pedestrian corridors, intersection improvement projects, and greenways) (Chapter 3).

Program Recommendations for education, encouragement, and enforcement and Policy Review and Recommendations (Chapter 4).

Implementation recommendations that outline specific steps for achieving the plan's key elements including phasing and prioritization of the Pedestrian Network (Chapter 5).

Design Guidelines to guide the Town of Holly Springs in current facility design and standards (Chapter 6).

Appendices that provide a summary of public input, the prioritization matrix, cost estimates for the Pedestrian Network, and funding recommendations.

Footnotes

[1] Fox, Dr.. Kenneth R. *The Influence of physical activity on Mental Well-Being.*

[2] Centers for Disease Control and Prevention, Department of Health and Human Services

[3] U.S. Environmental Protection Agency (EPA). (2003). *Travel and Environmental Implications of School Siting.*

Existing Conditions 2

2.0 Overview

The Town of Holly Springs is located in southern Wake County, fifteen miles south of North Carolina's state capital. As Holly Springs experiences growth from the heavily populated Raleigh and RTP areas, it aims to preserve its small town atmosphere. The Town of less than 1,000 in 1990 grew to more than 9,000 in 2000. By 2006, the population was approximately 18,500.

In order to propose a comprehensive pedestrian system for the Town of Holly Springs, the existing conditions, such as existing pedestrian conditions, trip attractors, development activity, and land use characteristics are examined.

In addition, numerous plans, guidelines, and strategies have addressed issues related to pedestrian planning in Holly Springs such as connectivity, alternative transportation, land use, greenways, and other pedestrian-related initiatives on municipal, county, regional, state, and private levels. All of these documents represent important efforts, provide valuable insight and background, and have influenced the development of this plan.

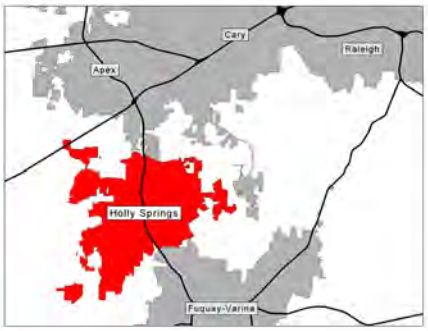


Figure 2(a): Context Map

The current plans are reviewed and summarized below only as they relate to pedestrian planning in Holly Springs. For further information on each plan, please consult the specific document in its entirety.

2.1 Existing Conditions

The Town of Holly Springs' geography and population characteristics have an overarching impact on the pedestrian planning process. They significantly affect transportation, the environment, local ordinances, and everyday decisions by motorists and pedestrians. Because of the even distribution of ages, increasing growth, and proximity to other municipalities and major transportation corridors, this Pedestrian Plan will recommend facilities that cater to these needs and take advantage of existing resources.

To understand pedestrian conditions in Holly Springs, it is important to consider a number of specific factors that affect the overall character of the community. The findings are presented below.

Achieving overall pedestrian connectivity is a major goal for this Plan. Currently, there is a lack of connectivity between pedestrian facilities and trip attractors. Significant gaps in existing facilities are also present.

Figure 2(b):
This intersection of Cayman and Holly Springs Roads features a well marked crosswalk but also showcases a sidewalk gap on the far side of the intersection.

Sidewalks

The majority of sidewalks found within the Town of Holly Springs are concentrated in individual neighborhoods. The curvilinear streets of newer subdivisions have sidewalk along at least one side of the roadway, which are currently meeting the needs of the neighborhood residents for the purpose of walking within the neighborhood. However, pedestrian connections between neighborhoods/subdivisions, the downtown, and schools are inadequate with many gaps, or non-existent, particularly along arterial roadways. Sidewalk facilities are inadequate or non-existent within older, established neighborhoods and within town. Therefore, newer development networks tend to be isolated from each other and from trip attractors around and in town.

Figure 2(c):
A pedestrian walking along North Main Street where a gap in the sidewalk network exists.

When the major arterial roadways through the Town of Holly Springs were constructed, pedestrian facilities, such as sidewalks were not included. As arterial roadways were improved and development occurred, sidewalks were added in segments to serve any new development on the adjacent land. The following arterial roadways do not provide adequate or safe pedestrian conditions:

- Main Street
- Avent Ferry Road
- Bass Lake Road
- Holly Springs Road (west of Main Street)

Also, the schools located throughout Holly Springs do not have adequate connections to nearby neighborhoods. There is a concern for pedestrian safety to and from the schools, specifically along Holly Springs Road at Holly Springs Elementary School, Holly Ridge Elementary School, and Holly Ridge Middle School.

Additionally Holly Springs High School and Holly Grove Elementary School lack connections to the nearby neighboring developments.

As an obstacle for future pedestrian planning, the Highway 55 bypass is a significant barrier to pedestrian travel from the east to west side of town.

Intersections and Crossing Conditions

There is a need throughout Holly Springs for crossing improvements. Insufficient crosswalks exist, especially at signaled intersections. Safe crosswalks are important because there is much greater risk for a pedestrian when entering the roadway environment. Safe crossing conditions are a necessity at intersections and in high pedestrian activity zones such as schools and shopping centers. Many intersection crosswalks in Holly Springs have no markings and those that do are simple and not as noticeable with only two solid parallel lines. In some cases, sight distance is inadequate, curb radii are too wide, and curb ramps are not found. Crossing signals only exist in a few locations (along Main Street). Marked crosswalks are found across Holly Springs Road near the elementary and middle schools but could still be improved through additional pedestrian facilities. All key intersections within Holly Springs are described in detail in Chart 3.1.

Figure 2(d):
The Middle Creek Greenway, an existing trail facility in Holly Springs.

Greenways

The existing greenway corridors within the Town of Holly Springs consist mainly of unimproved pedestrian facilities with only a few unconnected sections of paved trail. Existing greenway facilities are located in or near the following subdivisions:

- Braxton Village (unimproved footpath)
- Ballenridge (short section of paved multi-use trail)
- Bass Lake Park (crushed stone multi-use path)
- Arbor Creek P.U.D., along Middle Creek (unimproved footpath)
- Wescott (short section of paved multi-use trail and longer section of on-road sidewalk)
- Brackenridge Pointe and Carrington Estates
- Oakhall (Linear corridor/easement with no pedestrian

facility)
- Bridgewater
- Womble Park
- Holly Ridge Elementary and Middle Schools
- Fairhill
- Country Lane
- Scot's Laurel and Sunset Pointe

The greenway facility in Bass Lake Park is currently the longest, continuous greenway facility within the Town of Holly Springs.

Figure 2(e):
The Bass Lake Park and Retreat Center is an enticing trip attractor for Holly Springs.

Underpass/Overpass Facility

Currently, a pedestrian culvert underpass exists at the Highway 55 and Utley Creek intersection near the edge of Ballenridge subdivision. This facility was constructed along with the Highway 55 Bypass in preparation for future pedestrian connectivity between the eastern and western sides of Holly Springs.

Trip Attractors

People currently walk to a variety of destinations across Holly Springs for various purposes. These destination points are referred to in this document as trip attractors. The most common categories of pedestrian trip attractors in Holly Springs include:

- Downtown Village District
- Schools (Holly Springs Elementary, Holly Ridge Elementary, Holly Ridge Middle, Holly Grove Elementary, Holly Springs High)
- Shopping locations (grocery stores, shopping centers, restaurants, Downtown)
- Parks (Womble Park, Jones Park, Bass Lake Park, Veterans Park)
- Community and recreation centers (Hunt Community Center, Bass Lake Retreat Center)
- Historic and other points of interest (Town Hall, Cultural Center, Library, Holly Springs Cemetery)
- Places of employment (business areas, industrial parks, Town offices)

Each of these categories of pedestrian trip attractors was considered when determining locations for the physical pedestrian improvements recommended in Chapter 3. They represent

important starting and ending points for pedestrian travel and provide a good basis for planning ideal walking routes.

Development Activity

Holly Springs is a rapidly growing community, with heavy development activity. Most development has occurred since 1990 along and around NC 55 (Main Street) and more recently extending outwards along Holly Springs Road, Sunset Lake Road, Avent Ferry Road, and the NC 55 Bypass. The city limits radiate out from Downtown with Main Street and Holly Springs Road being the central intersection.

Residential growth has been extensive in recent years, leading to numerous new subdivisions with others under construction or slated for construction. Because of the increase in population, commercial growth has also occurred especially along Main Street. Spotty commercial hubs and new shopping centers are found at other intersections including Holly Springs Road/Sunset Lake Road, with expected additional growth at the NC 55 Bypass intersections with Avent Ferry Road and Main Street.

Figure 2(f):
The new Holly Springs High School will increase pedestrian activity along Avent Ferry Road.

The Downtown area, near the original springs of Holly Springs, has seen significant development over recent years. The Town Hall, and Mims Town Square. The Library and Cultural Center, under construction in 2006, are significant additions to the Downtown area of Holly Springs.

To provide for the increased population, a new high school and elementary school are being constructed in the southern end of Holly Springs off Avent Ferry Road. This adds to the existing two elementary schools and middle school along Holly Springs Road.

Land Use Characteristics

Current land use is a result of development activity over the past twenty years. Multiple land uses can be found across the Town of Holly Springs with distinct patterns emerging. These patterns and characteristics have a major influence on pedestrian transportation. Proximity of uses and types of uses matter in a person's choice to walk along with the quality of environment, ease of access, and safety.

Holly Springs is largely residential, with the roadway corridors of

Main Street, Hwy 55 Bypass, Holly Springs Road, and Avent Ferry Road providing commercial and institutional (schools and offices) areas. The Downtown area, or Village District, is appealing and walkable for pedestrians with Town offices and some multiple-use sites. Businesses, fast-food restaurants, and shopping centers occur on Main Street north of the Village District. There are three significant shopping center destinations: 1) Oak Hall Shopping Center on North Main Street, 2) Holly Springs Crossing at Holly Springs Road and Bass Lake Road and 3) Sunset Lake Shopping Center at Holly Springs Road and Sunset Lake Road. The Holly Springs Business Park is a large industrial and office area west of the Hwy 55 Bypass providing a major destination for workers.

Due to area growth and demand, large residential areas are developing on the extreme eastern and western sides of town. These homes will reside longer distances from the center of Town resulting in reduced pedestrian connectivity to various land uses. Multiple uses within new development and pedestrian connections towards the center of Town should be considered.

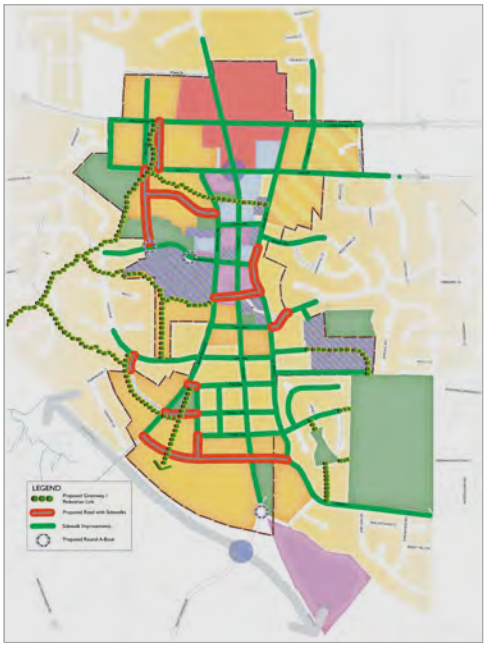


Figure 2(g): VDAP Land Use map.

2.2 Existing Planning Efforts

The numerous plans, guidelines, and strategies that address issues related to pedestrian planning in Holly Springs are briefly summarized below. They address connectivity, alternative transportation, land use, greenways, and other pedestrian-related initiatives on local, regional and state levels. All of these documents represent important efforts, provide valuable insight and background, and have influenced the development of this plan. For a detailed analysis of pedestrian-related policies in Holly Springs, please refer to Chapter 4, Programs and Policies.

Village District Area Plan (VDAP)

The VDAP describes the Town's vision for downtown and is highly compatible with the goals of the Pedestrian Plan. One of the primary goals of the VDAP is to provide pedestrian connections to the district. Recommendations related to pedestrian connectivity are found within the following subsections: Land Use, The Core Area, Transportation, Access & Circulation, Streets and Streetscapes, and in Development Design/Form.

In the implementation section of the VDAP, a short-term step

includes the incorporation of greenway and sidewalk facilities that are identified in the VDAP into the "future pedestrian master plan". The Holly Springs Pedestrian Transportation Plan incorporates said facilities and supports all VDAP pedestrian-related recommendations.

Unified Development Ordinance (UDO)

The Town of Holly Springs' Town Council adopted the UDO to encourage the most appropriate use of land throughout the Town and its extra-territorial jurisdiction. Its purposes that relate most to pedestrian planning include:

- Lessen congestion in the streets,
- Promote health and the general welfare,
- Facilitate the adequate provision of transportation and other public requirements promoting the public health and safety,
- Coordinate public facilities within proposed subdivisions with other existing or planned public facilities,
- Provide for the dedication or reservation of recreation areas within the subdivisions,
- Provide for the dedication or reservation of rights-of-way or easements,
- Provide for the construction of, or the payment of a fee-in-lieu of dedication for recreation, open space, and street facilities, and
- Distribute population and traffic in a manner that will avoid congestion and overcrowding and will create conditions essential to public health, safety, and the general welfare.

Sections of the Town of Holly Springs Unified Development Ordinance that most relate to pedestrian planning include the following:

Section 2.09	Development Options for Residential Districts
Section 3.02	Local Business District
Section 3.03	TV Town Village District
Section 3.05	CB Community Business District
Section 3.08	Architectural and Site Design

	Requirements
Section 5	Planned Unit Development District
Section 7.01	Landscaping Regulations
Section 7.06	Lot Design and Public Place Reservation
Section 7.06 F	Recreational Facilities and Open Space
Section 7.07	Street Design and Right-of-Way Reservation
Section 7.07 C 2	Walkway or Pedestrian / Bike Path Alternative
Section 7.07 C 3	Sidewalk, Walkway and Pedestrian & Bike Path Standards
Section 7.07 C 4	Pedestrian Access Easements'
Section 7.09	Pedestrian Circulation and Vehicular Area
Section 7.10	Open Space Regulations

The sections above are summarized in the policy section of Chapter 4, where recommendations are made for strengthening pedestrian-related policies.

Gateway Area Plan: Northeast Gateway Plan

This plan is a supplement to the Holly Springs land use plan and thoroughfare plans. It documents the town's vision and expectations for development in this gateway to Town and sets policies to guide future development. Sidewalks will be constructed along all roadways within the study area as development occurs and as funds become available for capital projects. A greenways system will also traverse the area and will connect to the sidewalk network. Pedestrian-related policy recommendations identified by the plan include the following: 1) Provide a pedestrian friendly environment, 2) Place parking to the rear and sides of buildings and bring buildings closer to the roadway 3) Mix of Uses –Office, Retail, Single Family, Multi-Family Residential, and 4) Provide interconnectivity through the use of shared driveways and limited curb cuts."

Town of Holly Springs Open Space Master Plan

This plan represents a long-term open space preservation program that identifies open space parcels for uses such as water quality protection, recreation, wildlife habitat protection, and scenic

land quality. Among the attributes included in the evaluation of land parcels is connectivity. The plan outlines existing and proposed greenway trails, including proposed underpasses and regional connections. Sections most related to pedestrian planning include:

Section 2.11	Greenway Trails
Section 2.12	Utility Corridors
Section 3.2.1	Identified Trail Connections

These sections are discussed further in the Policy section of Chapter 4. The Holly Springs Pedestrian Transportation Plan has taken the Open Space Plan's recommendations into account in developing the proposed pedestrian network, along with other proposed greenways.

Ten-Year Comprehensive Growth Plan

This Growth Plan is currently being updated and is scheduled for completion by spring 2007. The August 2005 update contains policies related to pedestrian connectivity in its sections on land use, parks and recreation, housing, transportation and environment.

Engineering Design & Construction Standards

The Town of Holly Springs Engineering Department relies on this set of standards for the development of construction plans for pedestrian facilities and traffic calming measures. These standards also reference the latest version of the Standard Specifications for Roads and Structures of the North Carolina Department of Transportation shall apply. The most applicable standards for this Pedestrian Transportation Plan include those for sidewalks, greenway trails, streets, traffic calming devices, and pedestrian facilities, such as pavement markings, pedestrian crossings, and street trees.

Capital Area Metropolitan Planning Organization (CAMPO) Bicycle and Pedestrian Plan

The vision of the CAMPO Bicycle and Pedestrian Plan is to make bicycle and pedestrian travel throughout the metropolitan area convenient, efficient, viable, and safe. The goals of the CAMPO Plan are to:

3 Pedestrian Network

3.0 Overview

A new pedestrian network plan for the Town of Holly Springs has been developed based on an examination of the existing conditions (Chapter 2) and an understanding of the community's vision and goals for an improved pedestrian network (Chapter 1). A review of the methodology and prioritization process used to create the Pedestrian Network Plan is provided below, followed by descriptions of the individual pedestrian corridor components: sidewalk projects, intersection improvements, and greenways.

Achieving overall pedestrian connectivity is a major goal for this Plan. Currently, there is a lack of connectivity between pedestrian facilities and trip attractors. Some of the connections are minor and will be relatively easy to implement, such as filling minor gaps within the existing sidewalk system. Other pedestrian connections will be more difficult and expensive to implement, such as the provision of sidewalks and crosswalks around most schools and commercial areas. These latter improvements, however, are highly valuable to the community, particularly in the realm of child safety. Improvements to these areas could potentially save lives and they could provide children with a safer route to school.

Figure 3(a): Fieldwork, shown here at the Holly Springs Nature Trail, was a key component of developing the recommended pedestrian network.

3.1 Pedestrian Network Methodology

A variety of information sources were consulted during the development of the Pedestrian Network: previous plans and studies, the consultants' fieldwork, public input and noted pedestrian trip attractors. The following list of informational inputs was used in the development of the pedestrian network.

- Locations of existing facilities
- Observed gaps in existing facilities or deficiently in facilities
- Locations of the existing arterial roads
- Locations of existing and future trip attractors, including schools, parks, shopping areas, downtown, etc.

- Locations of major street intersections and crossings
- Locations of safety concern (high pedestrian and auto traffic and inadequate facilities)
- Connectivity of regional pedestrian and greenway networks
- Opportunities for greenway development including open space, available land, easements, new developments
- Public comments made during community workshops and surveys
- Recommendations from representatives of the Steering Committee
- Field observations made by the consultant
- Planned sidewalk and greenway improvements from Holly Springs Capital Improvement Plan
- Projects and recommendations from previous planning efforts, summarized in Chapter 2, including the Village District Area Plan, Northeast Gateway Area Plan, and Open Space Master Plan

Figure 3(b): Connecting the pedestrian network to schools, like Holly Springs Elementary shown here, was an important goal when developing the pedestrian network.

Several concepts were developed as guides for the network development process. These concepts represented the interests expressed by the client, the steering committee, and the public. They also help achieve the goals articulated in other local planning documents. Some of the concepts that guided the development of the network included:

1. To provide adequate pedestrian access and connectivity to Downtown, schools, and shopping areas
2. To develop pedestrian facilities along arterial streets where no sidewalk or gaps in the existing sidewalk exist
3. To design or retrofit crossings to improve the safety of pedestrians
4. To take advantage of open space and hydrological resources to construct greenway trails to create a natural recreational experience for pedestrians

3.2 The Network

The Proposed Pedestrian Network for Holly Springs consists of sidewalk projects, intersection improvement projects and greenways corridor development. Together these proposed

facilities should be developed or improved to create a safe and connected pedestrian network throughout the Town. The network includes on-road pedestrian facilities (sidewalks, intersection, and crosswalk improvements) and off-road facilities (greenways). On-road and off-road components should be integrated together to provide a connected pedestrian transportation and recreation network.

The network will be completed in phases as prioritized in Chapter 5, Implementation. However, the network segments should be developed when there is opportunity, regardless of the order. Successful development of the Holly Springs Pedestrian Network will require a long-term, cooperative effort between the Town, the North Carolina Department of Transportation, and other local and state agencies. Regional connectivity should also be considered during future development of the sidewalk and greenway network.

All pedestrian corridor projects undertaken by the Town of Holly Springs should aim to meet the highest standards possible. At a minimum, each pedestrian corridor should possess curb cuts with ramps at all driveways and intersections. Within each identified corridor, roadway intersections should have marked crosswalks, and major intersections should have pedestrian crossing signals. Sidewalks should be constructed on both sides of the street along thoroughfares and residential collectors. Wider sidewalks, with curb cuts and improved surface conditions will correct sidewalks that currently do not satisfy the standards set forth by the American Disability Act of 1991. Traffic calming measures, such as curb extensions, traffic circles, medians, and pedestrian islands should be used to create a more hospitable environment for pedestrians in neighborhoods and in dense pedestrian districts. See Chapter 6, Design Guidelines for specific descriptions on recommended facilities. Finally, opportunities should be taken to incorporate pedestrian facilities into all municipal and state roadway improvement and widening projects, even if the route is not designated as a pedestrian corridor within this plan.

Figure 3(c):
Gaps in sidewalk connectivity, like this one on Holly Springs Road, were identified and added to the recommended pedestrian network.

Three main types of pedestrian projects have been identified for the Town of Holly Springs and are outlined below. They include sidewalk projects, intersection improvement projects, and greenway corridors. Design guidelines in Chapter 6 provide

detailed information regarding proper placement and facility treatments.

Sidewalk Projects

Sidewalk projects are the major component of the proposed pedestrian corridors in Holly Springs. Sidewalk projects are located along road segments that require sidewalks on both sides of the roadway to provide adequate pedestrian connections throughout the Town of Holly Springs. The pedestrian corridor network is focused on significant roadways that provide service to major destinations within Holly Springs and link multiple land uses, such as residential, recreational, institutional, and commercial. The proposed pedestrian facilities along significant roadways craft the spine of the entire pedestrian network. Some sections along these significant roadways have existing sidewalk. However, the existing sidewalk is segmented, creating gaps in the connectivity or lacking sidewalk on one side of the street. Sidewalk projects are prioritized in Appendix B and high priority segments are illustrated on Map B.1. Recommended sidewalk projects include the placement of sidewalk on both sides of the street where needed.

Intersection Improvement Projects

Consultant fieldwork and public input identified numerous intersections in Holly Springs that are in need of minor to significant pedestrian facility improvements. Intersections present a situation where a pedestrian must traverse the motor vehicle environment and adequate facilities should be provided, specific to the intersection, to provide a safe crossing environment. Below is a list of intersections targeted for pedestrian facility improvement. Specific observations and recommendations are outlined in Table 3.1 and illustrated on Map 3.1.

- Main Street and Oak Hall/Cayman
- Main Street and Oak Hall/Springstone
- Holly Springs Road and Main Street
- Holly Springs Road and Cayman
- Holly Springs Road and Cobblepoint Way
- Holly Springs Road and Middlecrest Way
- Holly Springs Road and Linksland Drive
- Holly Springs Road and Sunset Lake Road
- Holly Springs Road and Bass Lake Road

- ~ Sunset Lake Road and Wescott Ridge Road
- ~ Bass Lake Road (Bass Lake Park) and Salem Ridge Road
- ~ Bass Lake Road and Brook Manor
- ~ South Main Street and Highway 55 Bypass (end) and Ralph Stephens
- ~ South Main Street and Teal Lake/Ralph Stephens
- ~ Optimist Farm Road and Roseberry Road
- ~ Highway 55 Bypass and Ballentine Road
- ~ Avent Ferry Road and Highway 55 Bypass
- ~ Avent Ferry Road and Cass Holt Road

Greenway Corridors

Greenway corridors are off-road, multi-use facilities that provide an excellent source for alternative transportation and recreation. Greenway corridors can also serve an environmental purpose, to protect forests and enhance water quality. Greenway corridors can be constructed of natural materials, gravel, crushed stone, asphalt, or concrete, depending upon the projected usage and surrounding landscape. These corridors typically take advantage of linear stream corridors, easements, and other tracts of open space. Greenway trails in Holly Springs should be integrated with and serve as an off-road extension of the on-road pedestrian network. Numerous greenway opportunities were identified throughout Holly Springs, via consultant fieldwork, public input, and previous local and regional planning efforts. Proposed greenway corridors are illustrated on Map 3.1.



Figure 3(d):
The existing greenway (east of Town), underpass at Utley Creek/NC 55 Bypass, and sewer easement (west of Town), provide an excellent opportunity to connect central Holly Springs westward to other developing areas of Town and provide access across a major roadway obstacle.

3.3 Regional Connections

Holly Springs' proximity to the greater Raleigh-Durham metropolitan area enables the Town to not only develop a local pedestrian network, but to link up with neighboring communities and become a component of a regional pedestrian network. Raleigh, Cary, Apex and Fuquay-Varina have regional pedestrian and greenway recommendations that this plan is in accordance with. Additionally, CAMPO has engaged in numerous efforts to establish a regional network of pedestrian and greenway recommendations throughout Wake County. As development continues in outlying portions of Holly Springs, the Town should work together with neighboring communities to fill in gaps and link their respective pedestrian networks.

Upon evaluation of existing planning efforts from surrounding communities, a network of regional pedestrian connection corridors has been identified for the Holly Springs area. These corridors are illustrated on Map 3.2 and discussed below.

A unique regional pedestrian connection exists with the near by American Tobacco Trail (ATT). The ATT is a regional multi-use trail constructed on an abandoned rail line and is also a segment of the East Coast Greenway. The ATT begins in Downtown Durham, extends south across northeast Chatham County and currently terminates in southwest Wake County in the Bonsal community. The current terminus of the ATT is located near the intersection of New Hill-Olive Chapel Road and Olive Dairy Road, just to the northwest of Holly Springs. A proposed extension of the ATT will link the current terminus of the trail to Harris Lake Park in southern Wake County. The proposed corridor for this extension is located just to the west of Holly Springs. It is recommended that Holly Springs work with local land owners to acquire property to establish spur trails from the Town to the proposed ATT extension corridor. Contact Triangle Rails-to-Trails for more information (www.triangletrails.org).

The proposed I-540 interstate corridor traverses the northern edge of Holly Springs and offers a potential to incorporate a long distance regional pedestrian element to the project. The Apex Bicycle Plan calls for the establishment of a multi-use greenway trail along this corridor and it is recommended that this facility

be extended to serve the Holly Springs area as well. This facility will offer a long distance corridor that will be utilized by a wide variety of users from across the area.

Northern and northeastern Holly Springs are in close proximity to existing greenway facilities in both Apex and Cary. Emphasis should be placed on linking existing and proposed greenway corridors in Holly Springs with Apex and Cary.

The Middle Creek corridor extends southeasterly from Holly Springs to Fuquay-Varina. Presently, this corridor terminates into a predominately rural area. Holly Springs should investigate establishing a regional spur trail along this corridor to the North Carolina Mountains-to-Sea Trail, which follows the Neuse River in Wake and Johnston Counties. Such a spur could provide a southern link between the East Coast Greenway and the North Carolina Mountains-to-Sea Trail, two major regional trail initiatives. Contact the North Carolina Department of Environment and Natural Resources, State Trails Coordinator for more information about the (www.enr.state.nc.us).

Regional pedestrian connections will benefit the citizens of Holly Springs by offering long distance alternative transportation and recreation benefits. Additionally, citizens from throughout the region will enjoy access to the Town of Holly Springs thus providing an economic benefit to the Town.

Programs and Policies 4

4.0 Overview

The creation and implementation of a successful pedestrian system will involve more than facility improvements. The long-term success will also depend on use and support of pedestrian facilities. The following recommended programs will aid Holly Springs in educating pedestrians about safe behaviors in a multimodal roadway environment, enforcing laws that make pedestrian travel safer, and encouraging people of all ages and abilities to use the pedestrian network for the promotion of health and wellness. The adoption of the proposed policy revisions in this chapter will ensure that the growing Town of Holly Springs will continue to grow and evolve as a pedestrian friendly environment for all generations to enjoy.

4.1 Programs

Public Education

The Town of Holly Springs should encourage the development of a local pedestrian advocacy group and a variety of safety materials for distribution. A local advocacy group is a beneficial resource to promote safe pedestrian travel, provide feedback for opportunities and obstacles within the pedestrian system, and coordinate events and education and outreach opportunities. Educational materials can focus on safe behaviors, rules, and responsibilities. Information may include important pedestrian laws, 5 to 10 keys to safe pedestrian travel, safe motor vehicle operation around pedestrians, and general facility rules and regulations. This safety information can be distributed through brochures, newsletters, newspapers, and other print media that can be inserted into routine mailings. It can also be posted on municipal websites and shown on local cable access television. Events, such as Bass Lake Day and HollyFest should be utilized to distribute information and a representative from the pedestrian advocacy group can answer any questions related to pedestrian safety. A booth could also be used to display safety information at various community events.

Figure 4(a):
Hubs of recreational activities, such as the Hunt Community Center, provide great opportunities to promote the pedestrian system.

Action
Encourage the formation of a local pedestrian advocacy group

Action
Produce a variety of safety materials for distribution to various age groups and at various events/locations

Internal Education

Agency staff and members of local planning and review boards should participate in annual training sessions on integrating pedestrian travel into all projects. Internal training will be essential to institutionalizing pedestrian issues into the everyday operations of the engineering, planning, and parks & recreation departments. This training should cover all aspects of the transportation and development process, including planning, design, development review, construction, and maintenance. This type of 'inreach' can be in the form of brown bag lunches, professional certification programs and special sessions or conferences. Pedestrian planning and design issues are complex, and national research and guidelines continue to evolve. Therefore, training sessions need to be updated and repeated on a regular basis.

Figure 4(b):
Properly trained Crossing Guards can greatly improve the safety of crossing conditions for school commuters.

Also, local law enforcement should be trained in accurate reporting of pedestrian crashes involving automobiles. In many communities, police do not always adequately understand the rights of pedestrians. Proper interpretation of individual circumstances and events is critical for proper enforcement and respect between motorists and pedestrians. Special training sessions should be instituted and occur annually for new employees within the Police Department that focus on laws relating to pedestrian travel.

Action
Holly Springs should sponsor annual training sessions for Pedestrian Design/Review

Action
Holly Springs should sponsor a session for new members of Law Enforcement focusing on Pedestrian Issues

Resources
America Walks is a national coalition of local advocacy groups dedicated to promoting walkable communities. Their mission is to foster the development of community-based pedestrian advocacy groups, to educate the public about the benefits of walking, and, when appropriate, to act as a collective voice for walking advocates. They provide a support network for local pedestrian advocacy groups. To get started visit their website,
http://americawalks.org

Safe Communities is a project of the National Highway Traffic Safety Administration (NHTSA). Nine agencies within the U.S. Department of Transportation are working together to promote and implement a safer national transportation system by combining the best injury prevention practices into the Safe Communities approach to serve as a model throughout the nation. To get them involved, start by visiting their website,
http://www.nhtsa.dot.gov/safecommunities/

Safe Kids Worldwide is a global network of organizations whose mission is to prevent accidental childhood injury, a leading killer of children 14 and under. More than 450 coalitions in 15 countries bring together health and safety experts, educators, corporations, foundations, governments and volunteers to educate and protect families. Visit their website to receive information about programs, involving media events, device distribution and hands-on educational activities for kids and their families:
http://www.usa.safekids.org/

Motorist Enforcement

Based on crash data analysis and observed patterns of behavior, law enforcement can use targeted enforcement to focus on key issues such as motorists speeding, not yielding to pedestrians in crosswalks, parking on sidewalks, etc.. Sidewalk parking, for example, is often not enforced but should be, to maintain pedestrian accessibility, avoid maintenance issues, and comply with Town ordinances. All of these key issues should be targeted and enforced consistently. The goal is for pedestrians and motorists to recognize and respect each other's rights on the roadway.

As traffic continues to increase on North Carolina's streets and highways, concern has grown over the safety of our children as they walk to and from school. At the same time, health agencies, alarmed at the increase in obesity and inactivity among children, are encouraging parents and communities to get their children walking and biking to school. In response, the Division of Bicycle and Pedestrian Transportation funded a study on pedestrian issues, including school zone safety, and decided to establish a consistent training program for law enforcement officers responsible for school crossing guards. According to the office of the North Carolina Attorney General, school crossing guards may be considered traffic control officers when proper training is provided as specified in GS 20-114.1.

Action
Target and enforce all illegal motorist behavior that may jeopardize the success of the Town's Pedestrian Network

Action
Require all Crossing Guards to complete an NCDOT Crossing Guard Training Program

Pedestrian Enforcement

Observations made by local trail and pedestrian facility users can be utilized to identify any conflicts or issues that require attention. To maintain proper use of trail facilities, volunteers could be used to patrol the trails, particularly on the most popular trails and on days of heavy use. The volunteer patrol can report any suspicious or unlawful activity, as well as answer any questions a trail user may have. The volunteer patrol could be a responsibility of the pedestrian advocacy group. When users of the pedestrian network witness unlawful activities, they should have a simple way of reporting the issue to police. A hot line should be created, which would compliment the Trail Patrol Programs, for people to call in and talk to a live operator or to leave a voice mail message about the activity they witnessed. Accidents can also be reported to this hot line. Accident locations can then be mapped to prioritize and support necessary facility improvements.

Action
Establish a local "Trail Patrol"

Action
Establish an Enforcement Hot line

Resources
NCDOT School Crossing Guard Program
http://www.ncdot.org/transit/bicycle/safety/programs_initiatives/crossing.html

NCDOT's A Guide to North Carolina Bicycle and Pedestrian Laws. For an online resource guide on laws related to pedestrian and bicycle safety (provided by the National Highway Traffic Safety Administration), visit www.nhtsa.dot.gov/people/injury/pedbimot/bike/resourceguide/index.html

Encouragement

School Programs

Currently, Holly Springs has a newly constructed high school, a middle school and 3 elementary schools. Although the

surrounding land uses to these school facilities are favorable, mostly residential or open space, the Town of Holly Springs is rapidly growing. The sidewalk system adjacent to school properties is inadequate. Gaps between sidewalk segments exist, preventing safe travel between neighborhoods and the schools. Crosswalk improvements are also needed. Access to off-road facilities, such as greenways, is limited. Many programs exist to aid communities in developing safer pedestrian facilities around schools. Other programs can be adopted by parents or the schools to provide initiatives for walking or biking. Information is available to encourage group travel, prevent pedestrian related injuries, and sponsor commuter related events. A "Walking School Bus" is an encouragement program that provides an alternative way to transport children to school. A parent can be responsible for accompanying a group of children to school by utilizing the pedestrian system in Holly Springs.

Figure 4(c): Encouragement programs, such as Safe Routes to School, provide assistance to communities for pedestrian improvements to commuter corridors, encouraging kids to bike or walk to school.

Awareness Days/Events

A specific day of the year can be devoted to a theme to raise awareness and celebrate issues relating to that theme. The following are examples of events that the Town of Holly Springs can use or modify to improve usage of pedestrian facilities:

Walk to Work Day/International Car Free Day

Designate one day a year for people to walk to work to help advance programs, promote active living, and raise awareness for environmental issues. Walk to Work Day can be at the end of an entire week or month of pedestrian promotional activities, including fitness expos, walking and jogging group activities, running and bicycling races and rides, etc.

Annual Pedestrian Day

This could be an annual event to celebrate the Town's pedestrian achievements for the year. Awards for pedestrian commuters, as well as booths, contests, and other events could be incorporated.

National Trails Day

This event is held every year in June. Other events, competitions, races, and tours can be held simultaneously to promote trail use within Holly Springs. The Parks and

Recreation-Trails Division sponsors National Trails Day for the City of Greensboro every year and it has become a huge event for the City.

Alternative Uses for Facilities

Another way to promote usage is to promote alternative uses for facilities. Skateboarding or rollerblading could be included as a use on specific trails for a specified day every month during the summer, to encourage activity. If an activity is allowed with set rules and regulations and at a set time, destruction or abuse of facilities for unintended uses would be reduced.

Figure 4(d):
Existing trails, such as the Springs of Holly Springs Nature Trail, could be improved with the addition of interpretive signage to showcase plants, historical points of interest, or significant features along the trail.

Use Facilities to Promote Other Causes

Network facilities could be used for events that promote other causes, such as health awareness. Not only does the event raise money/publicity for a specific cause, but it encourages and promotes healthy living and an active lifestyle, while raising awareness for pedestrian activities. Non-profit organizations such as the American Cancer Society, American Heart Association, and the Red Cross sponsor events such as Breast Cancer Walk, Diabetes Walk, Juvenile Diabetes Walk, etc.

Action
Encourage children to walk to school, safely, through a combination of programs, listed under encouragement resources

Action
Establish awareness days

Interpretive Trails/Guided Tours

An educational component to the pedestrian network could be added by developing historical, cultural, and environmental themes for the facilities. This idea can be adapted to create walking tours throughout the Town, using signage, to identify the events, architecture, and landmarks that make the Town of Holly Springs unique. These tours should be simple to navigate and should stand alone as an amenity. However, brochures can be used to supplement signage with more detailed information and a map of the tour. Other ideas to supplement the signage could be organized "talks" or lectures by local experts.

Action
Create a Self-Guided Walking Tour of Historical/Cultural Sites in Downtown

Action
Establish an environmental tour of creek/springs

Action
Establish a Walking Tour that follows the original railroad alignment wherever possible (i.e. not through private property).

Action
Establish outdoor classrooms-utilizing open space, parks, greenways, etc.

Art in the Landscape

The inclusion of art along trail and pedestrian corridors would encourage use of facilities and provide a place for artwork and healthy expression to occur. Artwork could be displayed in a variety of ways and through an assortment of materials. Living artwork could be "painted" through the design and planting of various plant materials. Sculpture could be arranged as an outdoor museum. Art through movement and expression could be displayed during certain hours during the day or during seasonal events. An "Art Walk" could be established as an event along a trail. The National Mall in Washington D.C. has the National Gallery Sculpture Garden, an outdoor art museum that attracts thousands of visitors each year. Artwork can be provided by local schools, special interest clubs and organizations, or donated in honor or memory of someone.

Pedestrian Activities as Clubs

The Town of Holly Springs has numerous organizations that could be utilized to promote pedestrian activities. Education, enforcement, and encouragement programs can be advertised and discussed in club newsletters, seminars, and committee meetings. The following are suggested target groups or ideas to support the development of new clubs and organizations:

Homeowner Associations

After the Town of Holly Springs updates the new development policies relating to pedestrian facility incorporation, more pedestrian facilities will emerge. HOA's could be a source for promoting neighborhood walks, clean-ups, and routine maintenance tasks.

Walking/Running Clubs

Neighborhoods or large businesses could promote walking or

running clubs for local residents or employees to meet at a designated area and exercise before work, every Wednesday afternoon, or on a lunch break. This informal group could be advertised on local bulletin or information boards. These clubs could be specialized to attract different interest groups.

- Mother's Morning Club (Mom's with strollers)
- Walking Wednesdays (Senior group)
- Lunch Bunch (group from the municipal building runs during lunch hour)

Adopt-A-Trail

Local clubs and organizations provide great volunteer services for maintaining and patrolling trails. This idea could be extended to follow tour routes or specified streets/sidewalks. A sign to recognize the club or organization could be posted as an incentive to sustain high quality volunteer service.

Figure 4(e):
The newly constructed High School was designed to accommodate pedestrian commuter traffic.

Resources

Safe Routes to School is a national program with $612 million dedicated from Congress from 2005 to 2009. Local Safe Routes to School programs are sustained by parents, community leaders, and citizens to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school.
Recently, the state of North Carolina has started the NC Safe Routes to School Program based off of the national program. The state has $15 million over the next 5 years for infrastructure improvements within 2 miles of schools. This funding can also be used towards the development of school related programs to improve safety and walkability initiatives. The state requires the completion of a competitive application to apply for funding and a workshop at the school to determine what improvements are needed. http://www.saferoutesinfo.org/

National Walk our Children to School Day is usually held in October with the objective to encourage adults to teach children to practice safe pedestrian behavior, to identify safe routes to school, and to remind everyone of the health benefits of walking. To register walking events in Holly Springs, go to the main webpage, and follow the International Walk to School links: www.walktoschool-usa.org

Walk a Child to School in North Carolina. Forty years ago, half of all U.S. school children walked to school. Today, according to the Centers for Disease Control, only an estimated 10 percent walk to school. In many communities as much as 30 percent of morning commuter traffic is generated by parents driving their children to school. These traffic habits and children's lifestyle choices can have serious consequences. Traffic jams around our schools foul the air, waste fuel, and create safety problems for children. In addition, the U.S. Surgeon General recently reported that thirteen percent of children aged 6 to 11 years and 14 percent of adolescents aged 12 to 19 were overweight in 1999. This statistic has nearly tripled in the past two decades for adolescents. A

growing number of community groups throughout the nation, such as health professionals, Smart Growth advocates, traffic safety groups, local PTAs, and elected officials, are promoting walking to school initiatives. Some states have passed legislation instituting "Safe Routes to Schools" programs to encourage schoolchildren to walk or bike to school. The primary emphasis of these programs is to provide children with an opportunity to walk or bike to school in a safe, secure environment. In North Carolina, Walk a Child to School Programs have gained a foothold and are growing each year. To date more than 5,000 students in 12 communities in the state have participated.

The web site offers a history of Walk to School Day, child pedestrian information, resources for planning events and online registration. http://www.walktoschool.org

Preventing Pedestrian Crashes: Preschool/Elementary School Children provides information to parents on pedestrian risks for preschool and elementary school children. Safe and Sober Campaign. Taken from the NHTSA website.
http://www.nhtsa.dot.gov/people/outreach/safesobr/15qp/web/sbprevent.html

Kidswalk-to-School is a resource guide to help communities develop and implement a year-long walk-to-school initiative. Centers for Disease Control and Prevention.
http://www.cdc.gov/nccdphp/dnpa/kidswalk/kidswalk_guide.htm

Safekids is a child safety information website. Pedestrian injury remains the third leading cause of unintentional injury-related death among children ages 5 to 14.
http://www.safekids.org/

Pedestrian Fatalities Related to School Travel is a fact sheet pertaining to school age children. NHTSA.
http://www.nhtsa.dot.gov/people/injury/pedbimot/ped/Getting_to_School/pedestrian.html

Rules of the Road for Grandchildren: Safety Tips is an information website for grandparenting. If you are a grandparent, you can play an important role in teaching your grandchildren the "rules of the road." AARP.
http://www.aarp.org/confacts/grandparents/rulesroad.html

Streets in America are unsafe and unforgiving for kids
Article by the Pedestrian Safety Roadshow. U.S. Department of Transportation. Federal Highway Administration.
http://www.tfhrc.gov/safety/pedbike/articles/unsafe.htm

Focusing on the Child Pedestrian
Pedestrian Information from the FHWA.
http://safety.fhwa.dot.gov/roaduser/pdf/PedFacts.pdf

Stepping Out-Older Adult Education on Pedestrian Safety
www.nhtsa.dot.gov/people/injury/olddrive/SteppingOut/index.html

Figure 4(f):
"Walking School Buses" provide a safe way to transport children to school and foster outdoor exercise. Here children walk near Womble Park.

Programs to Generate Revenue

Holly Springs should be proactive in increasing revenue from programs and events that can help fund the building, management, and maintenance of future facilities. It will be necessary for staff to be assigned to focus on programming, researching further program ideas, and work with local groups, non-profits, schools, and citizens to develop programs further. Local foundations and agencies could organize and host events.

An increase in these types of events and an increase in promotion and advertising will help increase interest and attendance. Promotion can occur through local media, newspaper, and websites. Fees should be increased in events annually or biannually to increase revenue. Specific program and event ideas that are being used across the country include:

Figure 4(g):
Even children who ride the bus to and from school should be knowledgeable about safe pedestrian travel.

- Races/triathlons (fees and donations)
- Concessions
- Educational walks/Nature walks
- Fund-raisers including dinners/galas
- Moonlight bike rides and walks
- Greenway parade
- Concerts
- Art events along greenway
- Events coincident with other local events such as fairs, festivals, historic/folk events, etc.

4.2 Pedestrian-Related Policies in Holly Springs

This section outlines existing pedestrian-related policies in the Town of Holly Springs and recommends specific steps to strengthen those policies. The recommendations below were developed by first analyzing existing policies, then comparing them to national standards and other local state-of-the-art pedestrian initiatives. Representatives from the Town of Holly Springs Department of Planning & Zoning, Department of Engineering, Department of Parks and Recreation, and the Pedestrian Plan Steering Committee have provided guidance for these recommendations. Action steps for implementation are provided throughout this chapter, and can also be found in the overall list of action steps provided in Chapter 5, Implementation.

Several key requirements for pedestrian facilities are listed

below. These and other requirements for creating a safe and convenient environment for pedestrian transportation should be integrated into all policy documents for the Town of Holly Springs. They apply to all new roadway construction and roadway reconstruction projects in the downtown, suburban, and rural areas, as appropriate (e.g., areas where new developments are being constructed).

- Sidewalks should be provided on both sides of all collector, subcollector, and local streets (except for short cul-de-sacs, permanent dead-end streets, and roadways in areas with rural development (e.g., less than one dwelling unit per 6 acres).

- Sidewalks should have a minimum width of five feet but should be wider where pedestrian traffic is higher.

- The buffer space between the sidewalk and the curb and gutter should be maximized within the available right-of-way. 4' is suggested as an absolute minimum. Larger buffers are preferred for street tree health and pedestrian comfort.

- Raised medians or pedestrian refuge islands should be provided, where practical, at crosswalks on streets with more than three lanes, especially on streets with high volumes of traffic. They should be six- to ten-feet wide.

- Pedestrians and bicyclists should be accommodated on roadway bridges, underpasses, and interchanges and on any other roadways that are impacted by a bridge, underpass, or interchange project (except on roadways where they are prohibited by law). All new bridges should be constructed with bicycle lanes and wide sidewalks.

- On multi-lane roadways with excess existing and future traffic capacity, underutilized travel lanes should be removed. This extra right-of-way space should be used for bicycle and pedestrian facilities.

- Developers should be required to provide alternative transportation connections between developments to provide connectivity.

More recommended changes to specific policy documents are provided below in **bold**, along with excerpts from those documents that are related to pedestrian planning. For summary descriptions of each document, please refer to Section 2.2, Existing Planning Efforts, in Chapter Two.

Village District Area Plan (VDAP)

Sections of the VDAP that relate most to pedestrian planning include the following:

Land Use:

- "Celebrate the history of Holly Springs with a 'history walk' or other means of connecting a collection of historic structures and sites in the Village District. Integrated into the fabric of the Village District this walk could become part of the set of attractors that bring people into the District." The plan then lists the Town's historic assets. (VDAP, p.13)

- "As recommended in the Market Study, the Town should participate in small projects that link existing and proposed amenities and civic anchors, creating a true pedestrian-oriented area." (VDAP, p.13)

The Core Area:

- A critical feature of the VDAP includes a "Strong pedestrian linkage between the Town Hall and the Library and Cultural Center." (VDAP, p.19)

Transportation, Access & Circulation:

- "Creating true accessibility will require the provision of clear and safe routes through the district in the form of an enhanced, well-connected street network with facilities to accommodate motorized and non-motorized traffic." (VDAP, p.25)

- "Provide better collector street connections between residential communities and the Village District by incorporating bicycle and pedestrian elements. (VDAP, p.25)

- "Require that new developments create a circulation plan – submit it as an element of the development application and depicting the following: pedestrian access and circulation, type of infrastructure (sidewalk vs. multiuse path), connections to adjacent pedestrian facilities, bicycle facilities, and transit, if applicable. (VDAP, p.26)

- "Include bicycle and pedestrian facilities to ensure that both are convenient options for traveling to and through the Village District. Pedestrian accommodations include sidewalks as well as benches and other seating areas." (VDAP, p.27)

- "Extend greenway and multi-use connections beyond the core of the Village District, ensuring that they are well-integrated into the sidewalk network and are creating strong linkages to the core (see VDAP map for reference)." (VDAP, p.27)

- "Build sidewalks and close gaps along existing collector streets (Holly Springs Road, Raleigh Road, and Ballentine Street)." (VDAP, p.27)

- "Install sidewalks on Main Street from Third Street to Maple Avenue." (VDAP, p.27)

- "Connect Lakeside community to existing Womble Park Greenway." (VDAP, p.27)

- "Provide greenway connection between Avent Ferry Road and the Cultural Center." (VDAP, p.27)

- "Provide pedestrian accommodations as a part of development and redevelopment along all roadways." (VDAP, p.27)

- "Pedestrian facilities (sidewalk or multi-use path) shall be installed along both sides of all new streets as shown on the VDAP map." (VDAP, p.27)

- "Pedestrian facilities (sidewalk or multi-use path) shall be installed along one side of existing cross-streets (east-

Figure 4(h):
There is a multitude of pedestrian friendly storefront design throughout the world and even locally. Shown here is Wilmington, NC.

west)." (VDAP, p.27)

- "Pedestrian facilities (sidewalk or multiuse path) shall be installed along both sides of Raleigh Street, Main Street, and Avent Ferry Road within the Village District." (VDAP, p.27)

Streets and Streetscapes:

- "A successful "Main Street" is well-designed, defined by a strong building edge, and enhanced by features that blend to create a unique, appealing streetscape. Equally important is turning Main Street into a pedestrian-oriented area while ensuring sufficient movement of vehicular traffic." (VDAP, p.29)

- "Continue the process that will allow the Town to take over maintenance of Main Street from NCDOT. Without the need for approval from NCDOT, the Town can choose from a wider range of improvement options (such as crosswalk paving materials) and implementation time will be minimized." (VDAP, p.29)

- "Lower the posted speed to 25 miles per hour along Main Street." (VDAP, p.29)

- "Install crosswalks at intersections as well as at mid-block locations that, in addition to facilitating safe pedestrian movement, add variety to the streetscape." (VDAP, p.29)

- "Improve the streetscapes with wider sidewalks, plantable verge, street trees, and buried utilities." (VDAP, p.29)

Development Design/Form:

- "Encourage a compact form of development organized to create a continuous building edge. These edges along public streets and spaces define the public realm and give streets and spaces a scale that is more conducive to pedestrian activity." (VDAP, p. 35)

As noted in Chapter Two, the implementation section of the VDAP recommends the incorporation of greenway and

sidewalk facilities that are identified in the VDAP into the "future pedestrian master plan". The Holly Springs Pedestrian Transportation Plan incorporates said facilities and supports all VDAP pedestrian-related recommendations.

Unified Development Ordinance (UDO)

Sections of the Town of Holly Springs UDO that most relate to pedestrian planning are summarized below.

Section 2.09 Development Options for Residential Districts - This Section provides developers with "options" to design and build residential communities that encourage, among other things, the development of pedestrian oriented communities. Part C.2.d.(4),Vehicular Design and Pedestrian Connectivity, recommends the following pedestrian circulation enhancements. **This plan recommends the following requirements:**

> **(a) sidewalks on both sides of all local streets within the overall subdivision or project;**
> **(b) variation in street pavement texture or markings to delineate pedestrian cross-walks;**
> **(c) the provision of transit stops, bike racks, benches, shelters or other features to facilitate the convenience of pedestrian or alternative means of transportation within the overall subdivision or project; and,**
> **(d) include a sidewalk, walkway or pedestrian/bikeway system which functionally connects the various land use elements (single family, two family, multifamily, commercial or open space) of the overall subdivision or project. The above enhancements should not just be incentive-based, but should be a requirement.**

Section 3.03 TV Town Village District - This section promotes the development of the original central village core of the Town of Holly Springs. The development standards in this district are designed to encourage a pedestrian oriented design throughout the district and maintain an appropriate pedestrian scale.

Section 3.05 CB Community Business District - These districts are established to provide a location for high volume and high intensity commercial uses and shall be coordinated to facilitate

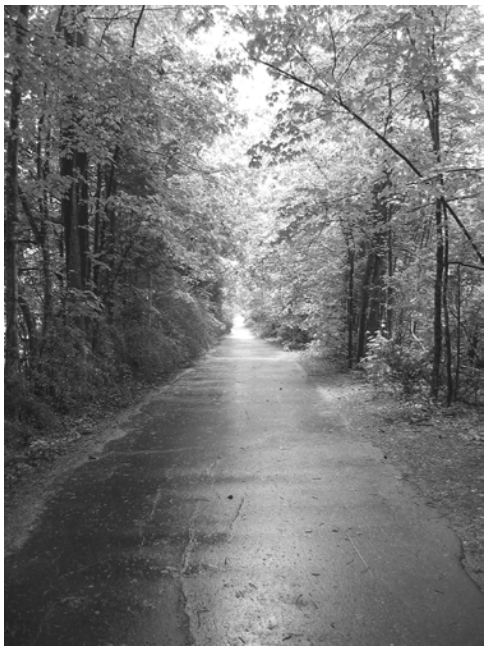


Figure 4(i):
An example of an alternative pedestrian / bike path in Greensboro, NC.

vehicular and pedestrian access from nearby residential districts.

Section 3.08 Architectural and Site Design Requirements - These requirements are intended to create and reinforce a positive, recognizable identity for the Town of Holly Springs by promoting the use of techniques to: create variation and interest in the built environment and allow for the development of functional, yet human scale office establishments. Part B.7, Open Space, encourages pedestrian friendly shopping facilities and human scale office, retail and other business establishments, regardless of the size of the project. It states that,

> "All integrated centers located in the LB, CB or GB districts shall include open space site design features such as plazas, courtyards, or other public gathering spaces, in an amount not less than the greater of two-hundred (200) square feet or two (2) percent of the gross floor area of the primary building of the integrated center." (UDO, Section 3.08, B.7)

In A.1.B Determination of Facade Orientation, **applicable buildings should be required to make the building front 'permeable'** (i.e., no blank walls). If the goal is "create variation and interest" and to have "pedestrian friendly shopping" on a "human scale", then patrons on foot need to be able to see in and out and enter the stores easily. Front doors should be visible from and directly face the sidewalk. Making the building open to the sidewalk is a common denominator of a pedestrian friendly environment.

Also in A.1.B, **applicable buildings should be required to build to the sidewalk** (i.e., property line). Also, **parking lots should be prohibited in front of buildings** applicable to standards in this section. These are crucial steps in creating pedestrian oriented areas. If these rules cannot be applied broadly, then they should, at a minimum, be applied to special area districts like the Village District and the Gateway District.

Section 5 Planned Unit Development District - This district is designed to encourage the master planning of development for larger tracts of land and to coordinate such development so as to, among other things, encourage creativity and innovation in the design of developments, including the layout of land uses and open space that promote high standards in design and

construction, and further the purposes of the Comprehensive Plan. Subsection 5.03, part B, 'Filing Petition for Zoning Map Change and PUD Master Plan', states that the Planning Board shall be guided by the extent to which the proposal provides for the development of common open space and recreational areas (passive or active) accessible to the residents or users of the PUD by way of sidewalks, footpaths, walkways or bikeways. In the same subsection, the Planning Board should also be guided by, **"12 - Extent to which the development proposed provides pedestrian connectivity to abutting and/or adjacent commercial, business, residential, and mixed-use areas".**

Section 7.01 Landscaping Regulations - Landscaping is an essential element of the site design process and is an important feature in promoting the public health, safety, comfort, convenience and general welfare of the Town of Holly Springs and its extra-territorial jurisdiction. This section promotes, among other things, the creation of landscape islands within vehicular areas to enhance pedestrian safety.

Section 7.06 Lot Design and Public Place Reservation- This section establishes guidelines for, among other things, the dedication or reservation of recreation areas to serve the needs of the owners or residents of a project or subdivision; adequate provision of parks, schools and playgrounds. In part C, 'Greenways', the ordinance states that,

> "In any case in which a greenway is indicated on an adopted plan of the Town of Holly Springs as being located on lands proposed for development, such greenway shall be dedicated and developed." (UDO, Section 7.06, C)

Section 7.06 F, Recreational Facilities and Open Space, states that in order to provide park, recreation, open space or greenway sites to serve the future residents of the Town of Holly Springs and its extraterritorial jurisdiction, in conformance with any adopted plans of the Town of Holly Springs, every residential subdivision shall, at the time of final plat, include:

> a. the dedication of a portion of such land, as set forth in this Section, below;
> b. an equitable amount of land in another location; or,

c. pay to the Town of Holly Springs a fee-in-lieu of dedication
(UDO, Section 7.06, F)

Section 7.07 Street Design and Right-of-Way Reservation- This section establishes guidelines for sidewalk location, and should be revised to **require sidewalks on both sides of all collector, subcollector, and local streets** (with the exception of short cul-de-sacs, dead-end streets, and roadways in areas with development less than one dwelling unit per 6 acres). Section 7.07 should also state that, "**Sidewalks should have a minimum width of five feet**". This will provide better pedestrian accommodation than the current requirements to be on both sides of the roadway except on residential collector streets and local streets in residential areas (where only one side is currently required).

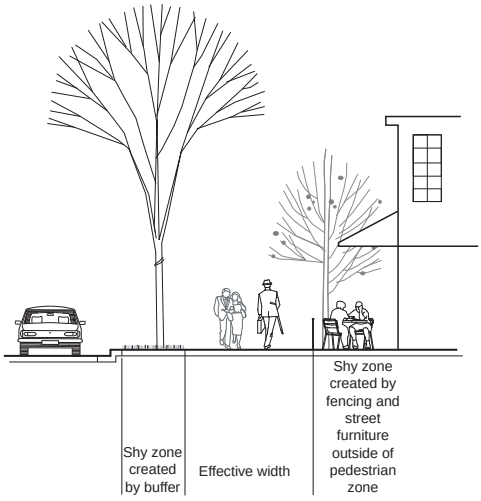


Figure 4(j):
Shown here a typical cross section of a pedestrian friendly environment. Note the effective width of the sidewalk after street furniture and plantings are included.

Section 7.07 C 2, 'Walkway or Pedestrian / Bike Path Alternative', states the following,

"Under appropriate circumstances or when approved for use as part of a development plan approval, an alternative walkway or pedestrian / bike path may be proposed in addition to sidewalks. Walkways or pedestrian / bike paths shall be a minimum of eight (8) feet in width to a maximum of eighteen (18) feet in width and may be located in easements reserved for such use outside of the street right-of-way" (UDO, Section 7.07, C, 2). **Minimum width for a pedestrian / bike path should be ten (10) feet** to allow for safe shared use between bicyclists and pedestrians.

Section 7.07 C 3, 'Sidewalk, Walkway and Pedestrian / Bike Path Standards' discusses material standards, and part C 4., 'Pedestrian Access Easements', states that,

"In order to facilitate pedestrian access from streets to schools, parks, playgrounds, or other nearby streets, a perpetual, unobstructed pedestrian access easement, at least twenty (20) feet in width, may be required. Such pedestrian access easements shall be provided: on the final plat; or, by separate grant of easement subject to the approval, by resolution, of the Board of Commissioners." (UDO, Section 7.07, C, 4).

Pedestrian Access Easements should be highly encouraged and actively sought by the Town Council as they allow not only safe routes to school, but also safe routes to parks and playgrounds, which are frequently used by children.

Section 7.08, Utility Design and Reservation – These requirements are intended to provide for orderly growth by establishing guidelines for: the coordination of the extension of new public facilities with existing public facilities; the dedication or reservation of rights-of-way or easements for utility purposes; and, adequate provision of water and sanitary sewer services. The section states that:

"Easements shall also be provided for: flood plains; wetlands; conservation areas; buffer areas; and, other areas of special designation or development restriction related to a specific geographic area" (UDO, Section 7.08, B.1.a).

'Greenways' should be added to this section as part of the required public infrastructure listed above. Greenways are public infrastructure that provide important functions to protect public health safety and welfare. Within flood prone landscapes, greenways offer the highest and best use of floodplain land, mitigate the impacts from frequent flooding and offer public utility agencies access to floodplains for inspection, monitoring and management. Greenways filter pollutants from stormwater and provide an essential habitat for native vegetation that serves to cleanse water of sediment. Greenway trails provide viable routes of travel for cyclists and pedestrians and serve as alternative transportation corridors for urban and suburban commuters. Greenways serve the health and wellness needs of our community, providing close-to-home and close-to-work access to quality outdoor environments where residents can participate in doctor prescribed or self-initiated health and wellness programs. All of these functions make greenways a vital part of community infrastructure.

Section 7.09 Pedestrian Circulation and Vehicular Area Design – These regulations are designed to promote high visual aesthetics

and functional pedestrian access in and around developments. This intent is accomplished by the connectivity of walkways and pedestrian/bikeway systems in and around a development with the general sidewalk system and greenway system. The development of private walkways or pedestrian/bikeway systems is required for all new developments and additions to existing developments. This section is provided, in its entirety as part of the Appendix. In part A.1 of Section 7.09, the following item should be added: "**G. Provide adequate pedestrian facilities across roadways to adjacent subdivisions** (e.g., crosswalks, signage, pedestrian refuge islands, curb ramps)". This will help to ensure that pedestrians in subdivisions are not divided and separated by roadways that lack safe opportunities to cross.

Section 7.10 Open Space Regulations -While open space may vary widely in terms of type, size, use and location, is a critical element in determining the quality of the built environment. Since open space dedication affects greenway development, this section is also provided, in its entirety as part of the Appendix. In part C, Dedication and Maintenance of Open Space, the following note should be added, **"As stated in UDO Section 7.06, Part C, in any case in which a greenway is indicated on an adopted plan of the Town of Holly Springs as being located on lands proposed for development, such greenway shall be dedicated and developed."** Adding this note to section 7.10 reinforces its intent to provide a high quality built environment.

Northeast Gateway Area Plan: Sunset Lake Road/Holly Springs Road

Pedestrian-related policy recommendations identified by the Northeast Gateway Area Plan include:

- "Provide a pedestrian friendly environment. A pedestrian friendly environment shall be accomplished by the use of safe crosswalk access from streets to store fronts including sidewalks on both sides of Holly Springs Road and Sunset Lake Road and with interior sidewalk connections through commercial developments. Greenways shall also be constructed to provide a natural connection between the residential subdivisions and the commercial centers in accordance with the Northeast Gateway Plan Land

Use Plan." (Northeast Gateway Area Plan, Plan Policies Section)

- "Place parking to the rear and sides of buildings and bring buildings closer to the roadway. Parking shall be placed to the rear and sides of buildings to create a pedestrian friendly environment and create the visual continuity of buildings facades along the streets rather than the 'sea of parking' that is common in older commercial developments." (Northeast Gateway Area Plan, Plan Policies Section)

- "Mix of Uses –Office, Retail, Single Family, Multi-Family Residential. Throughout the study area and mainly through the intersection of Holly Springs Road and Sunset Lake Road developments should include a mix of uses to ensure that the area is viable and sustainable. Having a mix of land uses encourages pedestrians and various activities in close proximity and reduces the need for vehicle trips on the Town's roadways." (Northeast Gateway Area Plan, Plan Policies Section)

- "Provide interconnectivity through the use of shared driveways and limited curb cuts. This policy will help ensure that access points along the thoroughfares will be minimized to ensure a safe and efficient traffic pattern and to reduce potential traffic disruptions." (Northeast Gateway Area Plan, Plan Policies Section)

- "Work with NCDOT to secure pedestrian underpasses on I-540 and Holly Springs Road." (Northeast Gateway Area Plan, Implementation Section)

Town of Holly Springs Open Space Master Plan

Potential trail initiatives identified by the Open Space Master Plan include:

Section 2.11, Greenway Trails, identifies 3.2 miles of existing trails, 46.6 miles of "Proposed Greenway Trails on Current Maps" and 73 miles of "Identified Links & trails from Open Space Study". (Open Space Plan, p.40)

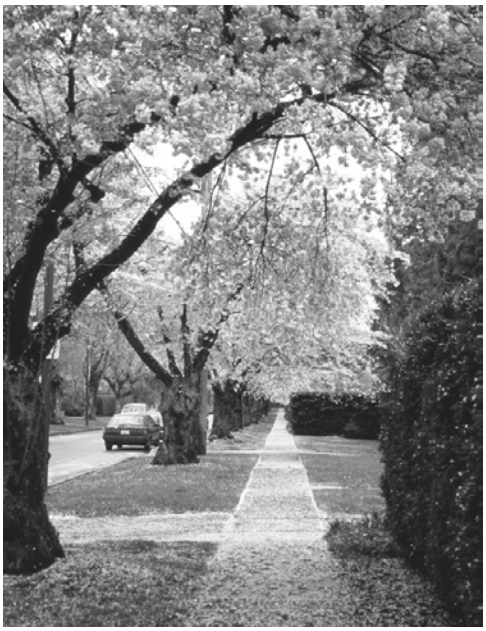


Figure 4(k):
Street trees create a sense of enclosure and guide a pedestrian with a pleasing steady pattern.

Section 2.12, Utility Corridors, identifies easements located throughout the entire Holly Springs vicinity and could provide large linear tracts of land to be utilized for open space and greater pedestrian connectivity. The following easements are identified in the Holly Springs Open Space Master Plan, p. 43:

CP&L Power Line Easements
25.0 Miles
Colonial Pipeline Gas Easement (Within Study Area)
4.30 Miles
Water Line Easements
22.1 Miles
Sewer Line Easements
21.2 Miles

Section 3.2.1, Identified Trail Connections, lists five potential trail corridors that would provide greater open space impact to areas on the verge of significant developmental growth.

Where possible, the 'Identified Trail Connections' were incorporated into the development of the greenway recommendations found within this Pedestrian Transportation Plan. **Town of Holly Springs' Parks and Recreation staff should negotiate opportunities for trail alignment within the utility corridors identified in Section 2.12 of the Open Space Master Plan, as well as within corridors of PSNC and Progress Energy.**

Ten-Year Comprehensive Growth Plan

The August 2005 statistical update contains policies related to pedestrian planning:

In the land use section, the creation of pedestrian-oriented developments is encouraged. The Town shall also ensure residential neighborhoods provide interconnectivity of roads and pedestrian pathways.

In the parks and recreation section, policies encourage that parks be located within a reasonable walk from each neighborhood within the study area. The Town shall develop a greenway system connecting parks and other points of interest, which will also link up with other municipal and county systems.

The housing section encourages mixed-use developments and encourages that they be interconnected and designed with pedestrian activity and interaction in mind.

The transportation section refers to an adopted Sidewalk Capital Improvement Plan that establishes a priority of needed sidewalk connections, which will provide input for the recommended facilities within this plan. The policies of the transportation section cite that subdivisions shall be designed to create a safe pedestrian environment and encourage pedestrian traffic. The Town shall also encourage all new roads to be built to accommodate and encourage pedestrian and bicycle activity.
The environment section encourages multi-modal travel and interconnected streets. It also suggests a tree preservation ordinance that could be designed to require street trees within pedestrian corridors.

Suggested modifications to the ten-year comprehensive growth plan include the following:

- In the Public Safety section, a **policy should be included to promote pedestrian safety,** advocating for the programs that are outlined in the first half of this chapter.

- In the transportation section, the objective should be changed to **"provide a safe and efficient multi-modal transportation system"**; or "transportation" could simply be defined elsewhere in the document to include alternative modes of transportation.

- In the Public Utilities section, a policy could be added to **encourage utility corridor development practices that allow for maximum compatibility with pedestrian and bikeway corridors.** Land purchased for the purpose of providing utilities (such as water and sewer) can serve a greater community benefit if developed to accommodate a multi-use trail. Also, utilities should be defined in this section to include 'Greenways' as infrastructure (see page 16, Chapter 4)

5 Implementation

5.0 Overview

The physical, program, and policy recommendations in the previous two chapters provide the ingredients while the implementation strategy provides a guide to execute these recommendations in a successful manner. It contains the tools for the Town of Holly Springs to actively see this Plan through to its fruition. It is important for positive, successful action to take place in order to build momentum and support throughout the community. A dedicated effort towards implementation over the next 10 to 20 years will make the Town of Holly Springs a more pedestrian-friendly community, thus achieving the goals set out by this Plan. The implementation strategy, covered in this chapter includes opportunities and strategies, key action steps, project prioritization and phasing, recommended operations, staffing, and management practices, evaluation and monitoring program, and methods for acquisition and pedestrian facility development.

Figure 5(a):
The pedestrian system will ultimately inter-connect all trip attractors, including downtown Holly Springs.

5.1 Opportunities and Strategies

The Town of Holly Springs has several opportunities that can help propel implementation. First, is the area's tremendous growth that will only continue. Policies, engineering, and design regarding new roads and developments should follow recommendations and design guidelines from this Plan to develop both on-road and off-road facilities. Where roadway construction and reconstruction projects occur, pedestrian facilities should be incorporated to reduce the overall cost of the system.

Second, is the existing network of sidewalks, greenways, and trip attractors. The Downtown area, schools, Womble Park and Bass Lake Park, and shopping centers are just some of the places people would like to walk to. Connecting all of these locations and filling gaps in the existing sidewalk network will serve to create a comprehensive, connected pedestrian system.

Third, is the local interest and numerous departments and agencies involved and interested in the development of this Plan. The organization

Figure 5(b):
The Steering Committee, shown here at the Pedestrian Plan Kick-off Meeting, is the base group of people to form the Committee that sees implementation through.

of active citizens, groups, clubs, schools, and the Town of Holly Springs will help advocate the pedestrian network development and stimulate volunteer efforts. **An inter-departmental coordinating committee, based from the Steering Committee formed during the formation of this Plan, should be formed to coordinate and oversee the implementation of this Plan which includes the development, operations, and maintenance of facilities.** This would function to continue communication and coordination between Town departments to ensure the integration of the sidewalk and greenway network. This committee would oversee the implementation of this Plan, develop programs, listen to community needs, promote the pedestrian network, review facility designs, and remain connected to adjoining municipality and regional pedestrian efforts. This committee should meet four times annually and include local citizens and staff from:

- Town of Holly Springs Planning & Zoning
- Town of Holly Springs Parks and Recreation
- Town of Holly Springs Engineering
- Town of Holly Springs Public Works Department
- CAMPO
- Wake County

5.2 Action Steps

The following Action Steps for implementation will guide the development of the proposed pedestrian network:

- Adopt this Plan. This should be considered the first step in implementation for Holly Springs. Through adoption of this document, the community is able to shape regional decisions so that they fit with the goals and recommendations of this Plan.

- Form the Inter-Departmental Committee described in above section to oversee, develop proper staffing, and promote implementation of the pedestrian system

- Secure the funding necessary to undertake the short term, top priority projects and develop a long term funding strategy to allow continued development of the overall system. Capital funds for sidewalk, crosswalk, and

greenway construction should be set aside for each year. Seek alternate federal, state, local, and private funding sources as well (described in Appendix D).

- Begin work on top priority projects listed in section 5.4.

- Begin acquiring land and easements necessary to complete priority greenway segments and provide connections between systems where there are gaps.

- Ensure that planning efforts are integrated with other municipalities' transportation planning efforts, as well as planning efforts at the county and state levels.

- Adopt sound policies and integrate strong pedestrian goals into future Town comprehensive and transportation planning efforts that enhance the Town's ability to develop pedestrian facilities as part of new development.

- Develop and implement education, encouragement, and awareness programs such as public events, which can be used to announce new walkways and upcoming projects and be a source of revenue.

An action schedule (Table 5.1) outlines more specifically the implementation steps for the Holly Springs Pedestrian Transportation Plan. It lists recommendations in the order presented in this Plan. It is intended as an initial guide but should be reviewed and updated as part of an evaluation and monitoring process described below.

5.3 Prioritization of Projects

The proposed pedestrian network for the Town of Holly Springs will likely be developed incrementally due to budget constraints and steady growth. This section describes how the recommended facilities are prioritized. Projects were prioritized by the following criteria:

- Ability to improve overall connectivity by filling pedestrian network gaps

Chapter	Recommendations	Lead Department/ Agency	Implementation Schedule (Short-term / Medium-term / Long-term)
3	Begin developing/constructing network in order of priority and/or opportunity		✓
	Develop x mile sidewalk system		← →
	Begin treatments/improvements to x identified intersection sites		✓
	Develop x mile trail system		← →
4	Encourage the formation of a local pedestrian advocacy group		← →
	Produce a variety of safety materials for distribution to various age groups and at various events/locations		✓
	Sponsor annual training sessions for Pedestrian Design/Review		← →
	Sponsor a session for new members of Law Enforcement focusing on Pedestrian Issues		← →
	Target and enforce all illegal motorist behavior that may jeopardize the success of the Town's Pedestrian Network		← →
	Require all Crossing Guards to complete a NCDOT Crossing Guard Training Program		← →
	Establish a local "Trail Patrol"		✓
	Establish an Enforcement Hot line		✓
	Encourage children to walk to school, safely, through a combination of programs, listed under encouragement resources		← →
	Establish awareness days		← →
	Establish self-guided walking tours to emphasize and showcase the historical, cultural, and environmental resources of Holly Springs		← →
	Establish art programs along pedestrian corridors		← →
	Encourage and support the creation of interest groups, clubs, and organizations that support the pedestrian system		← →

Table 5.1: Action Schedule

Chapter	Recommendations	Lead Department/ Agency	Implementation Schedule
5	Adopt the Plan		✓
	Form the Committee described in above section to oversee, develop proper staffing, and promote implementation of the pedestrian system		✓
	Secure the funding		◄——►
	Begin work on top priority projects listed in section 5.4.		✓
	Begin acquiring land and easements necessary to complete priority greenway segments and provide connections between systems where there are gaps.		✓
	Ensure that planning efforts are integrated with other municipalities' transportation planning efforts, as well as planning efforts at the county and state levels.		◄——►
	Adopt sound policies and integrate strong pedestrian goals into future Town comprehensive and transportation planning efforts that enhance the Town's ability to develop pedestrian facilities as part of new development.		✓
	Develop and implement education, encouragement, and awareness programs such as public events, which can be used to announce new walkways and upcoming projects and be a source of revenue.		◄——►
	Develop risk management strategy		✓
	Develop accurate and organized record-keeping process		◄——►
	Update signage, contact information, and educational/outreach materials at greenway facilities		◄——►
	Allocate a budget for operational and routine and remedial maintenance activities		◄——►
	Obtain sustainable funding sources to meet the needs of the budget		◄——►
	Maintain facilities in routine and remedial fashion		◄——►
	Pursue TIP assistance to improve safety or fulfill facility needs		◄——►

Table 5.1: Action Schedule

- Ability to improve safety and pedestrian options around schools, shopping centers, and residential areas

- Ability to serve underserved areas

- Ability to improve safety

- Utilization of routes suggested in previous planning efforts

- Utilization of routes recommended by public

- Consideration of future development patterns

- Opportunity such as future roadway construction or reconstruction, or easements with high potential in need of protection that are threatened with development pressure.

Specific variables used for a detailed prioritization scoring (described in Appendix B) are listed below:

- Elementary School Proximity -1/2 mile radius
- Middle School Proximity -1/2 mile radius
- High School Proximity –1/2 mile radius
- Direct Access to or from a School
- Parks, Recreation Centers, and Playgrounds Proximity - 1/2 mile radius
- Direct Access to/from Programmed Greenways
- Direct Access to/from Proposed Greenways
- Direct Access to/from High Density Residential
- Direct Access to/from Future Development
- Direct Access to/from Businesses/Shopping Centers
- Commercial Corridor – Main St. (Hwy 55), Holly Springs
- Point of Interest Proximity (1/2 mile radius) – Includes Womble Park and Bass Lake Park
- Regional and Citywide Connections - Includes links in and out of Holly Springs
- Connections to/from Downtown
- Connectivity to Existing Sidewalks – Based on sidewalk GIS layers developed by the Town of Holly Springs

Three phases for facility implementation are proposed as follows: the short term phase is 0-5 years; medium term phase is 5-10 years; long term phase is 10-20 years. A list of top priority action items have been pulled out of the first phase segments. Development efforts should occur within 0-3 years for these top priority, early-action items. These projects are specific improvements that will facilitate an immediate increase in connectivity, access, safety, and promotion of the network.

Top Priority Network Projects

The top priority projects are those which ranked highest in the prioritization matrix (Appendix B) and/or presented unique opportunities to have an immediate impact.

5.4 Operations and Maintenance

Operations and maintenance refers to specific day-to-day tasks and programs performed to assure resources and facilities are kept in good usable condition. This begins with sound design, durable components, and a comprehensive management plan. A management plan should be embraced by the entities responsible for maintaining the pedestrian and greenway network, at the beginning of the implementation process. In addition, community groups, residents, business owners, developers and other stakeholders should be engaged in the long term stewardship of the resources preserved and enhanced by this plan.

Guiding Principles for Effective Operations and Maintenance

The Holly Springs pedestrian network should be viewed and maintained as a public resource. It will become infrastructure similar to the street system or utility networks, serving the community for generations to come. The following guiding principles will help assure the preservation of a first class system:

- Good maintenance begins with sound planning and design

- Foremost, protect life, property and the environment

Figure 5(c):
Replacing greenway signage as necessary is an important remedial maintenance task.

- Promote and maintain a quality outdoor recreation experience
- Develop a management plan that is reviewed and updated annually with tasks, operational policies, standards, and routine and remedial maintenance goals
- Maintain quality control and conduct regular inspections
- Include field crews, police and fire/rescue personnel in both the design review and on-going management process
- Maintain an effective, responsive public feedback system and promote public participation
- Be a good neighbor to adjacent properties
- Operate a cost-effective program with sustainable funding sources

Operation and Maintenance Responsibilities

The pedestrian network should be operated and maintained by the Town of Holly Springs Public Works and Parks and Recreation Departments, NCDOT, and patrolled by the Town Police Department. A key to continued success will be the establishment and acceptance of pedestrian facility operations and maintenance guidelines and proper training of both supervisory and field personnel regarding on-road pedestrian facility upkeep. There should also be interagency coordination and user feedback protocols that assure timely response to citizen complaints and suggestions, including a website and toll-free hot line for pedestrian maintenance requests. Pedestrian signage should also be maintained by the Town of Holly Springs Public Works and Parks and Recreation Departments and NCDOT, depending on the types and locations of facilities. More specific department/ staffing information is described below in Section 5.5.

Operations Tasks

Key operation practices to include for greenway and pedestrian facilities include risk management, accurate and organized record keeping, updating informational signage and maps, and providing

contact information for facility users.

An effective risk management strategy is important, especially for greenways as the system is developed. It should include the following preventative measures:

- Schedule and document inspections to determine the amount of use, location, age, and condition of facilities. Follow-up with appropriate corrective measures if necessary.

- Evaluate and remove all obstacles or objects that could impede facility usage or pose danger and provide solutions such as alternative routing or obstacle removal.

- Implement a database management system of incidences (crimes and accidents) for tracking specific locations.

- Implement an emergency response protocol with law enforcement and EMS that includes mapping of access points, and an "address system" to identify locations for all off-road greenways. Where appropriate, 911 emergency phones should be installed. All EMS should have an updated map of all Town greenway and pedestrian facilities.

An accurate and organized record-keeping process is recommended to monitor tasks, identify levels of use, and prioritize management needs. Records should be kept of:

- Daily activities
- Schedule of routine and remedial maintenance tasks
- Hazards, incidents, and other safety items observed and action taken to address them
- Inspection reports
- Maintenance budgeting

The updating of signage, contact information, and information materials will enhance the quality of experience for greenway users. These include:

- Update information signage (rules and regulations) to

communicate proper usage
- Update directional signage to integrate on-road and off-road facilities and direct users to trip attractors in Holly Springs
- Update user maps to reflect any changes or additions to the pedestrian network
- Provide contact information and agency response for facility users to report comments, concerns, and complaints regarding their pedestrian experience.
- Provide public education and encouragement programs (See Chapter 4)

		Sidewalk Frequency	Trail Frequency	Recommendations
Routine Maintenance Activities				
Facility Maintenance	Sweeping	2 times / year		
	Trash Removal	6 times / year		
Vegetation Management	Tree and Shrub Trimming and Pruning	During regular roadway maintenance	Spring and Fall and as needed, such as after a storm to maintain 8' high and 12'-14' wide clearance	
	Mowing of Vegetation	30 times / year		
	Mulching and Edging	N/A	once / year or as needed to maintain trail surface	
	Invasive Species Control	once / year and as needed in problem areas		

Routine and Remedial Maintenance Tasks

Routine maintenance refers to the day-to-day regimen of litter pick-up, trash and debris removal, weed and dust control, trail sweeping, sign replacement, tree and shrub trimming, and other regularly scheduled activities. Routine maintenance also includes minor repairs and replacements such as fixing cracks and potholes or repairing a broken hand railing.

The following tasks should be performed on a regular basis to keep

		Sidewalk Frequency	Trail Frequency	Recommendations
Remedial Maintenance Activities				
Facility Repair or Replacement	Replenish gravel, mulch, or other surface materials	N/A	once / year and as needed to maintain trail surface	
	Repaint/Restripe/ Stain	2-4 years		Crosswalks, pavement markings
	Replace asphalt or concrete	10-12 years		Includes repairing curb
	Remove encroaching debris along paved trail/sidewalk edges	As needed		
	Regrade to prevent or eliminate low spots and drainage issues	As needed		
	Addition or repair of culverts, bridges, board-walks, retaining walls, etc. to prevent or eliminate drainage/ erosion issues	As needed to maximize the projected life span of each (See Table 5 (x)		
	Repair of ancillary facilities such as signage, pedestrian signals, etc.	As needed		Replace burned out or broken signal heads and adjust timers to MUTCD standard walking speed

all network facilities in good, usable condition. Maintenance tasks should be conducted more frequently for pedestrian and greenway facilities where use is the most concentrated. Methods such as pedestrian counts, sketch plan analysis methods for estimating pedestrian demand, public survey results, and public meeting comments can be used to determine which resources are the most heavily used and may require the most maintenance attention. The frequency of required maintenance tasks should be established as new facilities are implemented and should be reviewed and updated

Figure 5 (d):
Remedial Maintenance Activities

		Sidewalk Frequency	Trail Frequency	Recommendations
Remedial Maintenance Activities				
Habitat Enhancement and Control	Plant vegetation, such as trees and shrubs	Annual		Purchase of plant material should be part of the annual budget to provide shade trees downtown, enhance gateways, and reintroduce native species
	Apply herbicide to eliminate any problem areas	As needed to discourage growth of invasive species such as kudzu, poison ivy, etc.		
	Apply herbicide to maintain edges and prevent encroaching vegetation, such as along trails and sidewalks	As needed		
Seasonal Maintenance Activities				
Seasonal Maintenance	Remove leaf litter	As needed		Prioritize removal by the most heavily used facilities and geographic location.
	Remove snow and ice	As needed		

annually to reflect any changes in usage, safety issues, etc.

Remedial Maintenance refers to correcting significant defects in the network, as well as repairing, replacing or restoring major components that have been destroyed, damaged, or significantly deteriorated from normal usage and old age. Some items ("minor repairs") may occur on a five to ten year cycle such as repainting, seal coating asphalt pavement or replacing signage. Major reconstruction items will occur over a longer period or after an event such as a flood. Examples of major reconstruction remedial maintenance include stabilization of a severely eroded hillside, repaving a trail surface or a street used for biking. Remedial maintenance should be part of a long-term capital improvement plan.

Longevity of Facilities	
Mulch	2-3 years
Granular stone	7-10 years
Asphalt	7-15 years
Concrete	20 + years
Boardwalk	20 + years
Bridge/Underpass/Tunnel	100 + years

Figure 5 (e):
Remedial Maintenance Activities

All facilities will require repair or replacement at one time or another. The repair or replacement of existing facilities should be reflected in a projected budget for future maintenance costs. The time between observation and repair/replacement will depend on whether the needed repair is deemed a hazard, to what degree the needed repair will affect the safety of the user, and whether the needed repair can be performed by an in-house maintenance crew or if it is so extensive that the needed repair must be done by outside entities or replaced completely. Some repairs are minor, such as repainting or resurfacing crosswalks, and can be done in conjunction with other capital projects, such as repaving the adjacent street. The following tasks should be performed on an as needed basis to keep network facilities in good, usable condition.

Action Steps for O&M

- Develop risk management strategy
- Conduct annual inspections of all pedestrian and greenway

facilities and address any issues or problems as necessary
- Develop accurate and organized record-keeping process
- Update signage, contact information, and educational/outreach materials at greenway facilities
- Allocate a budget for operational and routine and remedial maintenance activities
- Obtain sustainable funding sources to meet the needs of the budget
- Maintain facilities in routine and remedial fashion

5.5 Staffing

The proper staffing for implementation, operation, and maintenance tasks described above is described here. The Committee described in Section 5.2 would be comprised of representatives from the departments described below and help oversee all activities.

Planning and Engineering Departments

First and foremost is the need for the Town to create a Pedestrian Coordinator position or deliver these tasks to a current Town planner or engineer with the capacity to task of implementing this Plan. The Coordinator would lead the effort to apply for funding, oversee planning, design, and construction of pedestrian facilities. The Coordinator would lead and assign tasks such as coordinating programming, leading public outreach, staff training on pedestrian issues, monitoring the use of and demand for pedestrian facilities, reporting to the planning and engineering departments, and proposing future alternative routes. The coordinator would also ensure coordination with surrounding municipalities (Fuquay-Varina, Apex, Cary, and Wake County) and with regional trail systems such as the American Tobacco Trail and East Coast Greenway.

The planning and engineering departments have other important roles. These include being responsible for site plan review to ensure pedestrian-friendliness, particularly in large residential and commercial development. Also, pedestrian-related GIS and mapping should be maintained, consolidated, and updated by GIS staff as new greenways and sidewalks are constructed. It is recommended that coordination occur between departments to construct a single, maintained pedestrian GIS layer (sidewalk and greenways) for the Town with informative attributes that include sidewalk width, length, material, etc.

Public Works Department / Town Engineering

The Public Works Director should oversee the construction and maintenance of all trail and pedestrian facilities. The Public Works section devoted to Streets should also be devoted to future recommendations for the pedestrian networks, discussed earlier in this plan. One member of the Public Works should handle facility development and construction (including posting pedestrian signs) among his/her other responsibilities.

North Carolina Department of Transportation

NCDOT Division Five should maintain pedestrian facilities within the roadway rights-of-way that are owned by the State. This only includes crosswalk facilities. The Town of Holly Springs is responsible for the maintenance of ALL sidewalks through Town. The Town can seek State funding through the Powell Bill to repair sidewalks (See Appendix D).

Figure 5 (f):
The Parks and Rec Department duties should include carrying out the greenway recommendations from this Plan.

Parks and Recreation Department

Duties for the Park and Recreation Department would include carrying out the greenway recommendations from this Plan, applying for funding, and overseeing all greenway facilities. Staff should also conduct tasks such as updating and publishing new maps, creating and updating GIS layers of all greenway facilities, proposing future alternative routes, and working with adjacent communities/counties to coordinate linkages to other greenways. The Parks and Recreation Director and/or staff should also play a role in education and encouragement programs.

Police Department

All local police officers should be educated about North Carolina's pedestrian laws to promote positive interactions between pedestrians and motorists. The Guide to North Carolina Bicycle and Pedestrian Laws, written by the NCDOT Division of Bicycle and Pedestrian Transportation, should be distributed to local law enforcement. Police officers should become more proactive in educating the public and enforcing laws when they are broken.

Volunteers

Services from volunteers, student labor, and seniors, or

donations of material and equipment may be provided in-kind, to offset construction and maintenance costs. Formalized maintenance agreements, such as adopt-a-trail/greenway or adopt-a-highway can be used to provide a regulated service agreement with volunteers. Other efforts and projects can be coordinated as needed with senior class projects, scout projects, interested organizations, clubs or a neighborhood's community service to provide for the basic needs of the proposed networks. Advantages of utilizing volunteers include reduced or donated planning and construction costs, community pride and personal connections to the City's greenway and pedestrian networks.

5.6 Establishing Performance Measures (Evaluation and Monitoring)

The Town of Holly Springs should work with local advocacy organizations to establish performance measures to benchmark progress towards achieving the goals of this Plan. These performance measures should be stated in an official report within one to two years after the Plan is adopted. Baseline data should be collected as soon as the performance measures are established. The performance measures should address the following aspects of pedestrian transportation and recreation in Holly Springs:

- Safety. Measures of pedestrian crashes or injuries.
- Usage. Measures of how many people walking on on-road and off-road facilities.
- Facilities. Measures of how many pedestrian facilities are available and the quality of these facilities.
- Education/Enforcement. Measures of the number of people educated or number of people ticketed as a part of a pedestrian safety campaign.
- Institutionalization. Measures of the total budget spent on pedestrian and greenway projects and programs or the number of municipal employees receiving pedestrian facility design training.

When establishing performance measures, the Town should consider utilizing data that can be collected cost-effectively and be reported at regular intervals, such as in a performance measures report that is published every two to three years. As the process of collecting and reporting pedestrian and greenway data is repeated over time, it will become more efficient. The data will be useful

for identifying trends in non-motorized transportation usage and conditions.

It will also be a responsibility of the Committee to evaluate and monitor the existing and recommended network over the next 25 years. The Committee should review process and progress and evolve and adapt as needed. Land use, transportation, development, and the overall landscape will continue to change as Holly Springs grows resulting in a dynamic area. Also new opportunities or input from an on-going monitoring and evaluation process may emerge, leading to the need to adapt and update the recommendations of this Plan.

5.7 Pedestrian Facility Development

This section describes different construction methods for the proposed pedestrian facilities outlined in Chapter 3 of this Plan.

Please note that many types of transportation facility construction and maintenance projects can be used to create new pedestrian facilities. It is much more cost-effective to provide pedestrian facilities during roadway and transit construction and re-construction projects than to initiate the improvements later as "retrofit" projects.

This section describes types of transportation facility construction and maintenance projects that can be used to create new pedestrian facilities. Note that roadway construction and reconstruction projects offer excellent opportunities to incorporate facility improvements for pedestrians. It is much more cost-effective to provide a pedestrian facility along with these other projects than to initiate the improvement later as a "retrofit."

To take advantage of upcoming opportunities and to incorporate pedestrian facilities into routine transportation and utility projects, the "Pedestrian Coordinator" should keep track of the Town's projects (through the Public Works Department) and any other local and NCDOT transportation improvements. While doing this, he/she should be aware of the different procedures for state and local roads and interstates. More detail on facility design and treatment can be found in Chapter 6.

NCDOT Transportation Improvement Program (TIP) Process

The Transportation Improvement Program (TIP) is an ongoing program at NCDOT which includes a process asking localities to present their transportation needs to state government. Pedestrian facility and safety needs are an important part of this process. Every other year, a series of TIP meetings are scheduled around the state. Following the conclusion of these meetings, all requests are evaluated. Pedestrian improvement requests, which meet project selection criteria, are then scheduled into a four-year program as part of the state's long-term transportation program.

There are two types of projects in the TIP: incidental and independent. Incidental projects are those that can be incorporated into a scheduled roadway improvement project. The pedestrian underpass at NC 55 Bypass and Utley Creek was an incidental project in the State's TIP. Independent are those that can standalone such as a greenway, not related to a particular roadway.

The Town of Holly Springs, guided by the Pedestrian Coordinator, should strongly consider important pedestrian projects along State roads to present to CAMPO and to the State. Local requests for small pedestrian projects, such as sidewalk links, should be directed to the relevant NCDOT Highway Division office. Further information, including the criteria evaluated can be found at: http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html

Local Roadway Construction and Reconstruction

Pedestrians should be accommodated any time a new road is constructed or an existing road is reconstructed. All new roads with moderate to heavy motor vehicle traffic should have sidewalks and safe intersection attributes. The Town of Holly Springs should take advantage of any upcoming construction projects, including roadway projects outlined in local comprehensive and transportation plans. Also, case law surrounding the ADA has found that roadway resurfacing constitutes an alteration, which requires the addition of curb ramps at intersections where they do not exist.

Residential and Commercial Development

As detailed in Chapter 4, the construction of sidewalks and safe crosswalks should be required during development. Construction begins on a blank slate and the development of pedestrian facilities

that corresponds with site construction is more cost-effective than retro-fitting. In commercial development, emphasis should also be focused on safe pedestrian access into, within, and through large parking lots. This ensures the future growth of the pedestrian network and the development of safe communities

Retrofit Roadways with New Pedestrian Facilities

There may be critical locations in the proposed Pedestrian Network that have pedestrian safety issues or are essential links to destinations. In these locations, it may be justified to add new pedestrian facilities before a roadway is scheduled to be reconstructed or utility/sewer work is scheduled.

In some places, such as Main Street, it may be relatively easy to add sidewalk segments to fill gaps, but other segments may require removing trees, relocating landscaping or fences, regrading ditches or cut and fill sections.

Figure 5 (g):
Provisions should be made to include walking facilities such as tunnels and bridges when deemed necessary.

Bridge Construction or Replacement

Provisions should always be made to include a walking facility as a part of vehicular bridges, underpasses, or tunnels, especially if the facility is part of the Pedestrian Network. All new or replacement bridges should accommodate pedestrians with wide sidewalks on both sides of the bridge. Even though bridge replacements do not occur regularly, it is important to consider these in longer-term pedestrian planning. NCDOT bridge policy states that sidewalks shall be included on new NCDOT road bridges with curb and gutter approach roadways. A determination of providing sidewalks on one or both sides is made during the planning process. Sidewalks across a new bridge shall be a minimum of five to six feet wide with a minimum handrail height of 42".

Signage and Wayfinding Projects

Signage along specific routes or throughout an entire community can be updated to make it easier for people to find destinations. Pedestrian route and greenway signs are one example of these wayfinding signs, and they can be installed along routes independently of other signage projects or as a part of a more comprehensive wayfinding improvement project.

5.8 Greenway Acquisition

Figure 5 (h):
Forming partnerships with land trusts and land managers makes more effective use of land acquisition funds and strategies for greenways.

There are several resources and strategies that can aid in the acquisition process. Enlisting the support of a local land trust could help broker land protection arrangements between private landowners and the Town of Holly Springs. Providing educational material to local landowners and developers about the benefits of greenways and land/easement donations is also an excellent means to stimulate greenway acquisition.

The following sections detail a list of specific strategies including the formation of partnerships and a toolbox of acquisition options.

Partnerships

The Town of Holly Springs should pursue partnerships with land trusts and land managers to make more effective use of its land acquisition funds and strategies. The following offers recommendations on how these partnerships could be strengthened

Land Trusts

Land trust organizations, such as the Trust for Public Lands and Triangle Land Conservancy, to name just two, are valuable partners for the Town of Holly Springs and Wake County, when it comes to acquiring land and rights-of-way for greenways. These groups can work directly with landowners and conduct their business in private so that sensitive land transactions are handled in an appropriate manner. Once the transaction has occurred, the land trust will usually convey the acquired land or easement to a public agency, such as the City or County for permanent stewardship and ownership.

Private Land Managers

Another possible partnership that could be strengthened would be with the utility companies that manage land throughout Holly Springs and in Wake County.

Electric utility companies have long recognized the value of partnering with both local communities, non-profit trail organizations and private land owners to permit their rights-of-ways to be used for trail development. This has occurred all over the United States and throughout North Carolina. In 1987, a

special report was prepared and published jointly by American Trails, Inc. and the Edison Electric Institute, entitled, Trails on Electric Utility Lands: A Model of Public-Private Partnership. The report features examples where trails and electric utility companies share the right-of-way. Some of the trails included in the report are the Calumet Trail, Foothills Trail, Illinois Prairie Path, Interurban Trail and Puget Power, Redmond Trail, Mason Dixon Trail and the Washington and Old Dominion Trail.

Natural gas companies, whose pipelines traverse the United States, have also allowed their rights-of-way to be used for trail development. This cooperative spirit may have been modified a bit since the events of September 11, 2001, however, there are plenty of examples throughout North Carolina and the nation where shared rights-of-way exist. Again, a publication entitled "Greenways, Wildlife and Natural Gas Pipeline Corridors: New Partnerships for Multiple Use," written by Keith G. Hay, and published in 1994 by the Conservation Fund, Arlington, VA, chronicles the success of this partnership. Some key excerpts from the book:

- Although 82% of the [gas transmission companies] companies reported that they had never had a liability suit filed by a recreational user of a ROW (right-of-way) corridor, concern over expensive lawsuits prevails. Each of the 13 companies that reported a liability suit were contacted to determine the nature of the liability action. In every lawsuit filed except one (a logging accident crossing a ROW), the plaintiff was driving either an ATV or a snowmobile on the ROW. All ATV drivers were trespassing.

- Potential partnerships with public groups should be viewed very positively and companies should be prepared to do some grassroots legwork with these groups. Many companies have found such efforts have paid off in facilitating the issuance of permits and increasing public support for projects. Such initiatives are highly recommended.

- Potential public interest partners have well-developed

avenues for publicizing their cooperative ventures with utilities. Companies would be well advised to take advantage of these opportunities to promote the positive aspects of these associations.

- Benefits to the utility. Eastern Trail shares its corridor with the following utility companies: Granite State Gas Transmission Company, Northern Utilities Natural Gas, Central Maine Power, Verizon and Biddeford, Scarborough Sanitation District and Saco Water Company.

  "Partnerships on greenways like the Eastern Trail provide utility companies with an uninterrupted, easily accessible, stretch of land that is relatively free from disturbance. The safe and efficient operation of utilities can be enhanced by the protective eyes and ears of trail users and advocates, who can report improper trail use and other situations that involve utility equipment."

Figure 5 (i):
Public easements, such as sewer, can be adapted into trail corridors.

The Town of Holly Springs should actively update and maintain relationships with private utility and land managers to ensure that community wide pedestrian and greenway system can be accommodated within these rights-of-way. The Town and county will need to demonstrate to these companies that maintenance will be addressed, liability will be reduced and minimized and access to utility needs will be provided.

Acquisition Tools

Because the majority of greenways exist in an off-road environment, the acquisition of land or easements becomes a critical part of the implementation process.
The following resources and tools can aid in the acquisition process:

Land Management

Management is a method of conserving the resources of a specific greenway parcel by an established set of policies called management plans for city-owned greenway land or through easements with private property owners. Property owners who grant easements retain all rights to the property except those, which have been described in the terms of the easement. The property owner is responsible for all taxes associated with the property, less the value of the easement granted. Easements are generally restricted to certain portions of the property, although

in certain cases an easement can be applied to an entire parcel of land. Easements are transferable through title transactions, thus the easement remains in effect perpetually. The following tools can be used as land management techniques.

- Management Plans
- Conservation Easement
- Preservation Easement
- Public Access Easements

Government Regulation

Regulation is defined as the government's ability to control the use and development of land through legislative powers. The following types of development ordinances are regulatory tools that can meet the challenges of projected suburban growth and development as well as conserve and protect greenway resources.

- Dedication/Density Transfers
- Negotiated Dedications
- Fee-in-Lieu
- Reservation of Land
- Buffer / Transition Zones
- Overlay Zones
- Subdivision Exactions

Acquisition

Acquisition requires land to be donated or purchased by a government body, public agency, greenway manager, or qualified conservation organization. The following acquisition tools can be useful when change in a property ownership is needed.

- Donation or Tax Incentives
- Fee Simple Purchase
- Easement Purchase
- Purchase / Lease Back
- Bargain Sale
- Option / First Right of Refusal
- Purchase of Development Rights
- Condemnation
- Eminent Domain

Design Guidelines 6

6.0 Overview

These guidelines originate from and adhere to national design standards as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act (ADA), the Federal Highway Administration (FHWA) Pedestrian Facilities Users Guide, the Manual on Uniform Traffic Control Devices (MUTCD), and the NCDOT. Should the national standards be revised in the future and result in discrepancies with this chapter, the national standards should prevail for all design decisions. Likewise, all cost information provided is relevant only at or around the date of this report (September 2006). A qualified engineer or landscape architect should be consulted for the most up to date and accurate cost estimates.

The sections below serve as an inventory of pedestrian design elements/treatments and provide guidelines for their development. These treatments and design guidelines are important because they represent minimum standards for creating a pedestrian-friendly, safe, accessible community, and have been tailored to meet the specific facility development needs of Holly Springs' pedestrian system. The guidelines are not, however, a substitute for a more thorough evaluation by a landscape architect or engineer upon implementation of facility improvements. Some improvements may also require cooperation with the NCDOT for specific design solutions.

Figure 6(a):
Well designed residential sidewalk[1].

6.1 Pedestrian Facility Elements

Sidewalks and Walkways

Sidewalks and walkways are extremely important public right-of-way components often times adjacent to, but separate from automobile traffic. In many ways, they act as the seam between private residences, stores, businesses, and the street. They are spaces where children play, neighbors meet and talk, shoppers meander casually, parents push strollers, and commuters walk to transit stops or directly to work. Because of the social importance of these

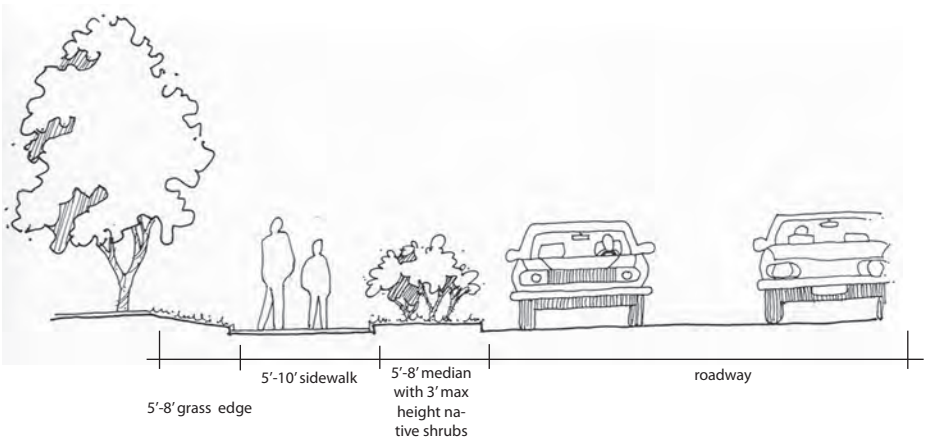


Figure 6(b):
Typical street with adjacent sidewalk

spaces, great attention should be paid to retrofit and renovate areas with disconnected, dangerous, or otherwise malfunctioning walkways.

There are a number of options for different settings, both urban and rural. From a European style promenade to, in the case of a more rural environment, a simple asphalt or crushed stone path next to a secondary road, walkway form and topography can vary greatly. In general, sidewalks are constructed of concrete although there are some successful examples where other materials such as asphalt, crushed stone, or other slip resistant material have been used. The width of the walkways should correspond to the conditions present in any given location (i.e. level of pedestrian traffic, building setbacks, or other important natural or cultural features). FHWA (Federal Highway Administration) and the Institute of Transportation Engineers both suggest five feet as the minimum width for a sidewalk. This is considered ample room for two people to walk abreast or for two pedestrians to pass each other. Often downtown areas, near schools, transit stops, or other areas of high pedestrian activity call for much wider sidewalks.

Sidewalks are typically built in curb and gutter sections. They need to be kept completely free of obstructions such as utility poles. A four to eight foot buffer zone parallel to the sidewalk or walkway is recommended to separate pedestrian traffic from automobile traffic and to keep the sidewalk free of light pole obstructions. Much like the sidewalk and walkway itself, the

form and topography of this buffer will vary greatly. Native street tree plantings have historically proven to work successfully within these buffer zones. They regulate micro-climate, create a desirable sense of enclosure, promote a local ecological identity and connection to place, and can act as a pleasant integration of nature into an urban environment. In the event that vegetation is not possible, a row of parked cars, bike lane, or street furniture can be used to create this buffer.

Figure 6(c): Sidewalk with a vegetated buffer zone. Notice the sense of enclosure created by the large canopy street trees[1].

Guidelines[3,9]:

- Concrete is preferred surface, providing the longest service life and requiring the least maintenance.
- Sidewalks should be built as flat as possible to accommodate all pedestrians; they should have a running grade of five percent or less; with a two percent maximum cross-slope.
- Concrete sidewalks should be built to minimum depth of four inches; six inches at driveways.
- Sidewalks should be a minimum of five feet wide; eight to ten feet wide within Downtown; ten feet can also be considered in other areas of heavy pedestrian traffic. When sidewalk abuts storefronts, an additional two feet of space from walls is recommended.
- Buffer zone of two to four feet in local or collector streets; five to six feet in arterial or major streets and up to eight feet in busy streets and Downtown to provide space for light poles and other street furniture. See the Vegetation section later in this chapter for shade and buffer opportunities of trees and shrubs.
- Motor vehicle access points should be kept to minimum.

Cost[1] :

Concrete curbing: $10-$15/linear foot
Walkways: $3/square foot
Asphalt walkways are much less expensive in terms of construction cost but more difficult to traverse and more expensive to maintain.

Greenway Trail

A greenway is defined as a linear corridor of land that can be either natural, such as rivers and streams, or manmade, such as abandoned railroad beds and utility corridors. Most greenways contain trails. Greenway trails can be paved or unpaved, and can be designed to accommodate a variety of trail users, including

bicyclists, walkers, hikers, joggers, skaters, horseback riders, and those confined to wheelchairs.

Single-tread, multi-use trails are the most common trail type in the nation. These trails vary in width and can accommodate a wide variety of users. The minimum width for two-directional trails is 10', however 12'-14' widths are preferred where heavy traffic is expected. Centerline stripes should be considered for paths that generate substantial amounts of pedestrian traffic. Possible conflicts between user groups must be considered during the design phase, as cyclists often travel at a faster speed than other users. Radii minimums should also be considered depending on the different user groups.

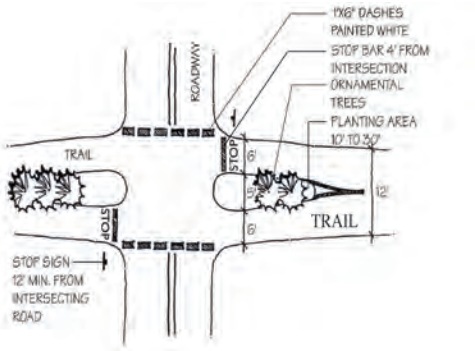


Figure 6(e):
Typical greenway trail approach to a roadway

While the vegetative clearing needed for these trails varies with the width of the trail. The minimum width for clearing and grubbing a 14' wide trail is 16'. Selective thinning increases sight lines and distances and enhances the safety of the trail user. This practice includes removal of underbrush and limbs to create open pockets within a forest canopy, but does not include the removal of the forest canopy itself.

Typical pavement design for a paved, off-road, multi-use trail should be based upon the specific loading and soil conditions for each project. These asphalt or concrete trails should be designed to withstand the loading requirements of occasional maintenance and emergency vehicles.

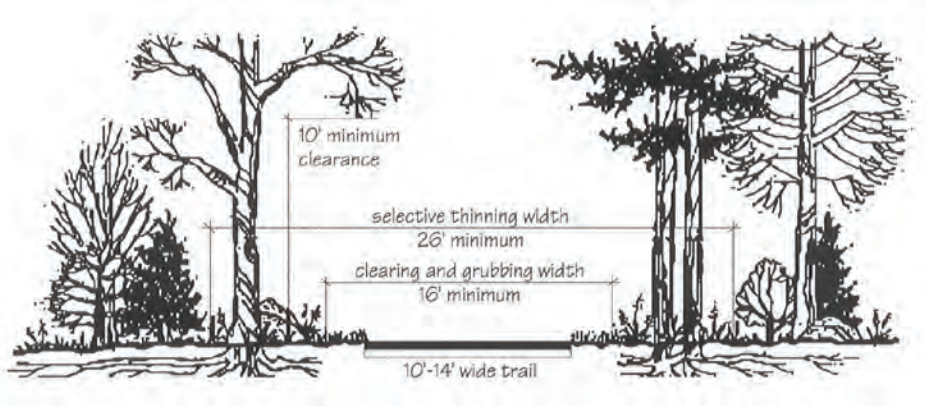


Figure 6(d):
Vegetation clearing guidelines

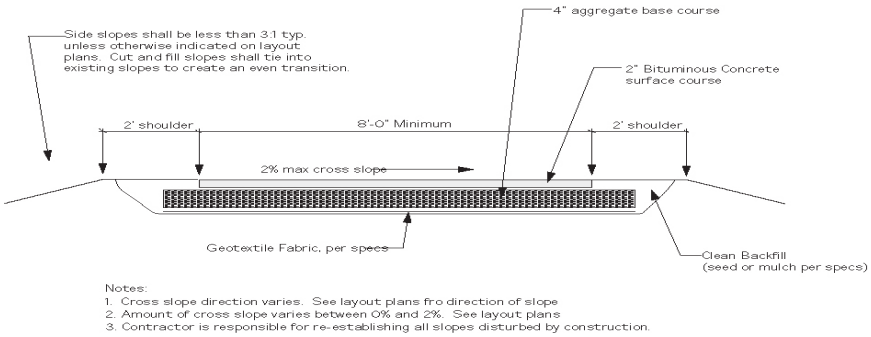


Figure 6(f):
Asphalt pavement construction detail

Concrete: In areas prone to frequent flooding, it is recommended that concrete be used because of its excellent durability. Concrete surfaces are capable of withstanding the most powerful environmental forces. They hold up well against the erosive action of water, root intrusion and subgrade deficiencies such as soft soils. Most often, concrete is used for intensive urban applications. Of all surface types, it is the strongest and has the lowest maintenance requirement, if it is properly installed.

Asphalt: Asphalt is a flexible pavement and can be installed on virtually any slope. One important concern for asphalt trails is the deterioration of trail edges. Installation of a geotextile fabric beneath a layer of aggregate base course (ABC) can help to maintain the edge of a trail. It is important to provide a 2' wide graded shoulder to prevent trail edges from crumbling.

Trail and Roadway Intersections: The images below present detailed specifications for the layout of intersections between trail corridors and roadways. Signage rules for these sorts of intersections are available in the MUTCD as well.

Marked Crosswalks

A marked crosswalk designates a pedestrian right-of-way across a street. It is often installed at controlled intersections or at key locations along the street (a.k.a. mid-block crossings) and in this Plan are prescribed for the Downtown, school areas, and key residential and commercial areas where pedestrian activity

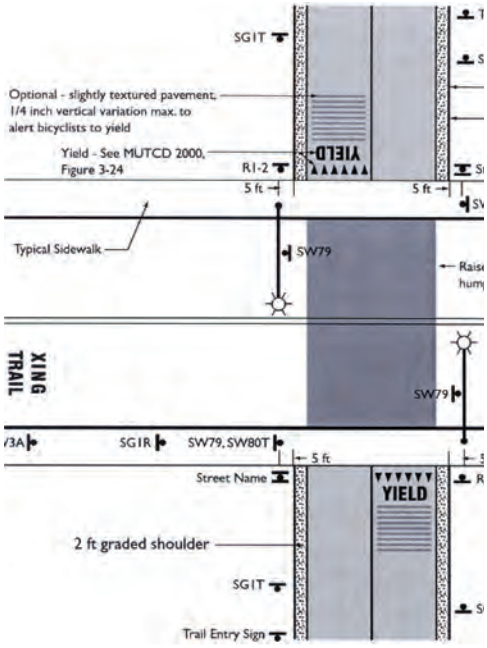


Figure 6(g):
Typical greenway trail crossing a roadway

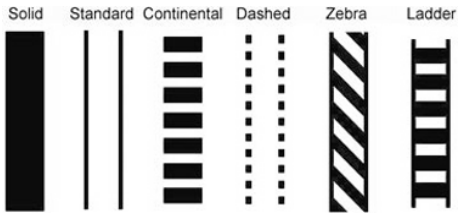


Figure 6(h):
Illustration of all the variety of patterns possible in designating a crosswalk[1].

is greatest. Although marked crosswalks provide strong visual clues to motorists that pedestrians are present, it is important to consider the use of these elements in conjunction with other traffic calming devices to fully recognize low traffic speeds and enhance pedestrian safety. In general, "marked crosswalks should not be installed in an uncontrolled environment where speeds exceed 40 mph"[3]. Every attempt should be made to install crossings in places where pedestrians are most likely to cross. A well-designed traffic calming location is not effective if pedestrians are using other unmodified and potentially dangerous locations to cross the street.

Marked pedestrian crosswalks may be used under the following conditions: 1) At locations with stop signs or traffic signals, 2) At non-signalized street crossing locations in designated school zones, and 3) At non-signalized locations where engineering judgment dictates that the use of specifically designated crosswalks are desirable[9].

Figure 6(i):
Notice the wide, well marked crosswalk with a crossing island in the middle. The size and street furniture decoration make this a safe and visible pedestrian crossing[1].

There is a variety of form, pattern, and materials to choose from when creating a marked crosswalk. It is important however to provide crosswalks that are not slippery, are free of tripping hazards, or are otherwise difficult to maneuver by any person including those with physical mobility or vision impairments. Although attractive materials such as inlaid stone or certain types of brick may provide character and aesthetic value, the crosswalk can become slippery. Also, as it degrades from use or if it is improperly installed, it may become a hazard for the mobility or vision impaired.

A variety of color or texture may be used to designate crossings. These materials should be smooth, skid-resistant, and visible[3]. Reflective paint is inexpensive but is considered more slippery than other devices such as inlay tape or thermoplastic. A variety of patterns may be employed as detailed in Figure 6(h). In areas with a high volume of pedestrian traffic, particularly at mid-block crossings, a crosswalk can be raised to create both a physical impediment for automobiles and a reinforced visual clue to the motorist.

An engineering study may need to be performed to determine the appropriate width of a crosswalk at a given location, however

marked crosswalks should not be less than six feet in width. In downtown areas or other locations of high pedestrian traffic, a width of ten feet or greater should be considered.

Guidelines[3, 9]:

- Should not be installed in an uncontrolled environment where speeds exceed 40 mph.
- Crosswalks alone may not be enough and should be used in conjunction with other measures to improve pedestrian crossing safety, particularly on roads with average daily traffic (ADT) above 10,000.
- Width of marked crosswalk should be at least six feet wide; ideally ten feet or wider in Downtown areas.
- Curb ramps and other sloped areas should be fully contained within the markings.
- Crosswalk markings should extend the full length of the crossings.
- Crosswalk markings should be white per MUTCD.
- Either the 'continental' or 'ladder' patterns are recommended for intersection improvements in Holly Springs for aesthetic and visibility purposes. Lines should be one to two feet wide and spaced one to five feet apart.

Cost[1]:

Regular striped:	$100
Continental :	$300
Ladder crosswalk:	$300
Pattern concrete:	$3,000

Maintenance cost varies according to region and pattern used

Advance Stop Bars

Moving the vehicle stop bar 15–30 feet back from the pedestrian crosswalk at signalized crossings and mid-block crossings increases vehicle and pedestrian visibility. Advance stop bars are 1–2 feet wide and they extend across all approach lanes at intersections. The time and distance created allows a buffer in which the pedestrian and motorist can interpret each other's intentions. Studies have shown that this distance translates directly into increased safety for both motorist and pedestrian. One study in particular claims that by simply adding a "Stop Here for Pedestrians" sign reduced pedestrian motorist conflict by 67%. When this was used in conjunction with advance stop lines, it increased to 90%[1].

Cost[1]:

Signage (if desired): $50 - $150 plus installation
No additional cost if new line is installed in new paving or as part of repaving

Figure 6(j):
Curb ramps shown have two separate ramps at the intersection[1].

Curb Ramps

Curb ramps are critical features that provide access between the sidewalk and roadway for wheelchair users, people using walkers, crutches, or handcarts, people pushing bicycles or strollers, and pedestrians with mobility or other physical impairments. In accordance with the 1973 Federal Rehabilitation Act and to comply with the 1990 Federal ADA requirements, curb ramps must be installed at all intersections and mid-block locations where pedestrian crossings exist[1]. In addition, these federal regulations require that all new constructed or altered roadways include curb ramps. Although the federally prescribed maximum slope for a curb ramp is 1:12 or 8.33% and the side flares of the curb ramp must not exceed a maximum slope of 1:10 or 10.0%, it is recommended that much less steep slopes be used whenever possible.

It is also recommended that two separate curb ramps be provided at each intersection (Figure 6(i)). With only one large curb ramp serving the entire corner, there is not safe connectivity for the pedestrian. Dangerous conditions exist when the single, large

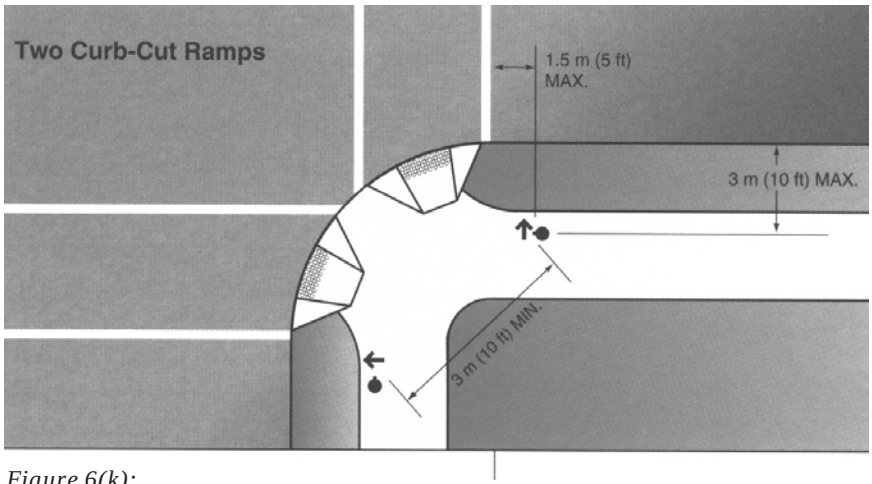


Figure 6(k):
Location of pedestrian push-button.[3]

curb ramp inadvertently directs a pedestrian into the center of the intersection, or in front of an unsuspecting, turning vehicle.

For additional information on curb ramps see *Accessible Rights-of-Way: A Design Guide*, by the U.S. Access Board and the Federal Highway Administration, and Designing Sidewalks and Trails for Access, Parts I and II, by the Federal Highway Administration. Visit: www.access-board.gov for the Access board's right-of-way report[1].

Guidelines[9]:

- Two separate curb ramps, one for each crosswalk, should be provided at corner of an intersection.
- Curb ramp should have a slope no greater than 1:12 (8.33%). Side flares should not exceed 1:10 (10%).

Cost[1]:

Curb ramp: $800 - $1,500 per ramp (new or retrofit)

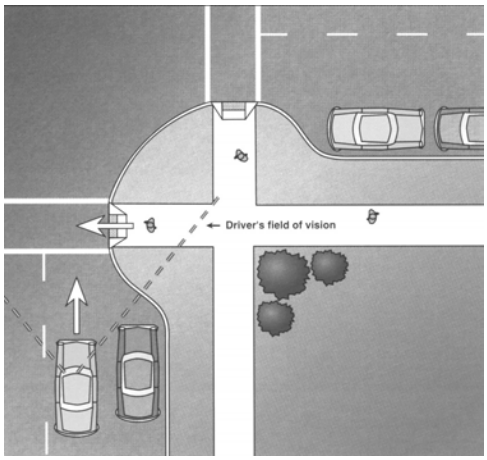


Figure 6(m):
By reducing a pedestrian's crossing distance, less time is spent in the roadway, and pedestrian vehicle conflicts are reduced.[3]

Raised or Lowered Medians

Medians are barriers in the center portion of a street or roadway[1]. When used in conjunction with mid-block or intersection crossings, they can be used as a crossing island to provide a place

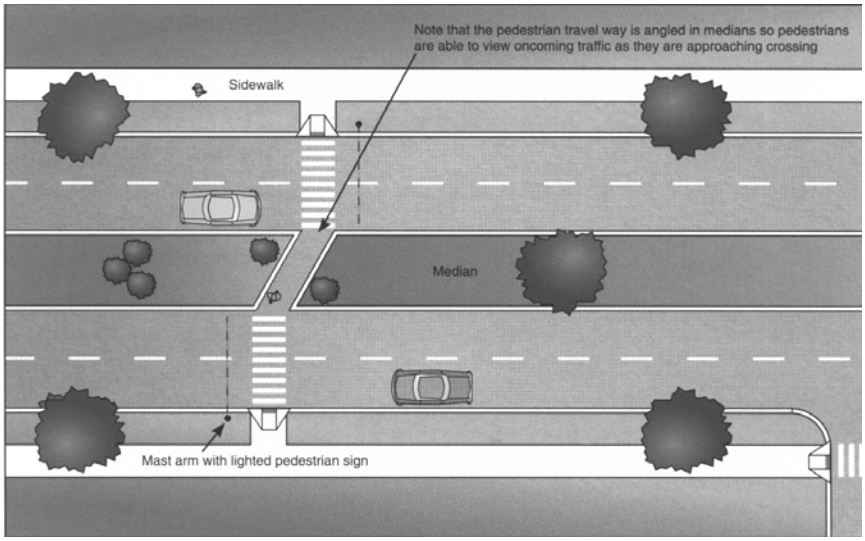


Figure (l):
A lowered median can be used to filter stormwater and provide a refuge for pedestrians crossing a roadway[3].

of refuge for pedestrians. They also provide opportunities for landscaping that in turn can help to slow traffic. A center turn lane can be converted into a raised or lowered median thus increasing motorist safety.

A continuous median can present several problems when used inappropriately. If all left-turn opportunities are removed, there runs a possibility for increased traffic speeds and unsafe U-turns at intersections. Additionally, the space occupied may be taking up room that could be used for bike lanes or other treatments discussed in this chapter. An alternative to the continuous median is to create a segmented median with left turn opportunities.

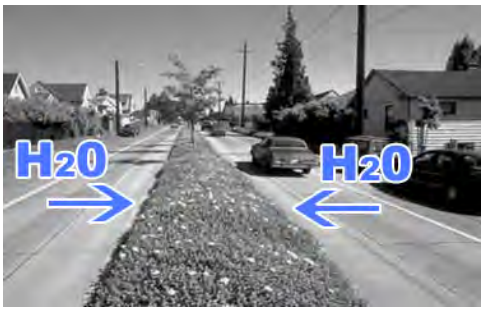


Figure 6(n):
An attractive lowered median landscaped to appear raised[1].

Raised or lowered medians are best suited for high-volume, high-speed roads, and they should provide ample cues for people with visual impairments to identify the boundary between the crossing island and the roadway.

Guidelines[3, 9]:

- Median pedestrian refuge islands should be provided as a place of refuge for pedestrians crossing busy or wide roadways at either mid-block locations or intersections. They should be utilized on high speed and high volume roadways.
- Medians should incorporate trees and plantings to change the character of the street and reduce motor vehicle speed.
- Landscaping should not obstruct the visibility between motorists and pedestrians.
- Median crossings should provide ramps or cut-throughs for ease of accessibility for all pedestrians
- Median crossings should be at least 6 feet wide in order to accommodate more than one pedestrian, while a width of 8 feet (where feasible) should be provided for bicycles, wheelchairs, and groups of pedestrians
- Median crossings should possess a minimum of a 4 foot square level landing to provide a rest point for wheelchair users.
- Pedestrian pushbuttons should be located in the median of all signalized mid-block crossings, where the roadway width is in excess of 60 feet.

Cost[1]:

Raised or lowered: $15,000 - $30,000 per 100 feet.

Bulb-outs

A bulb-out, or curb extension, is a place where the sidewalk extends into the parking lane of a street. Because these curb extensions physically narrow the roadway, a pedestrian's crossing distance and consequently the time spent in the street is reduced. They can be placed either at mid-block crossings or at intersections.

Sightlines and pedestrian visibility are reduced when motor vehicle parking encroaches too close to corners creating a dangerous situation for pedestrians. When placed at an intersection, bulb-outs preclude vehicle parking too close to a crosswalk. Also, bulb-outs at intersections can greatly reduce turning speed, especially if curb radii are set as tight as possible[1]. Finally, bulb-outs also reduce travel speeds when used in mid-block crossings because of the reduced street width.

Bulb-outs should only be used where there is an existing on-street parking lane and should never encroach into travel lanes, bike lanes, or shoulders[1].

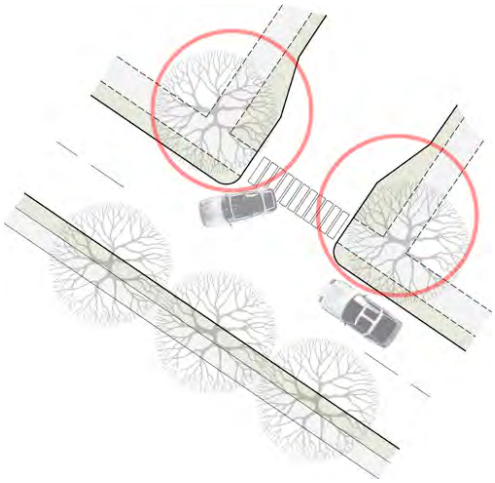


Figure 6(o):
By reducing a pedestrian's crossing distance, less time is spent in the roadway, and pedestrian vehicle conflicts are reduced.

Guidelines[10]:

- Bulb-outs should be used on crosswalks in heavy pedestrian areas where parking may limit the driver's view of the pedestrian.
- Where used, sidewalk bulb-outs should extend into the street for the width of a parking lane (a minimum five feet) in order to provide for a shorter crossing width, increased pedestrian visibility, more space for pedestrian queuing, and a place for sidewalk amenities and planting.
- Curb extensions should be used on mid-block crossing where feasible.
- Curb extensions may be inappropriate for use on corners where frequent right turns are made by trucks or buses.

Cost[1]:

Bulb-outs/Curb extensions: $2,000 - $20,000

Cost can increase depending on the amount of infrastructure that may have to be relocated.

Figure 6(p):
Attempting to separate pedestrians from the street is often problematic. As shown here, given the opportunity, many choose to cross at street level[1].

Pedestrian Overpass/Underpass

Pedestrian overpasses and underpasses efficiently allow for pedestrian movement across busy thoroughfares[1]. These types of facilities are problematic in many regards and should only be considered under suitable circumstances or where no other solution is possible. Perhaps the best argument for using them sparingly is that research proves pedestrians will avoid using such a facility if they perceive the ability to cross at grade as taking about the same amount of time[1].

The other areas of contention arise with the high cost of construction. There are also ADA requirements for stairs, ramps, and elevators that in many cases once complied with result in an enormous structure that is visually disruptive and difficult to access.

Overpasses work best when existing topography allows for smooth transitions. Underpasses as well work best with favorable topography when they are open and accessible, and exhibit a sense of safety[1]. Each should only be considered with rail lines, high volume traffic areas such as freeways, and other high volume arteries[1].

Guidelines[10]:

- Over and underpasses should be considered only for crossing arterials with greater than 20,000 vehicle trips per day and speeds 35 - 40 mph and over.
- Minimum widths for over and underpasses should follow the guidelines for sidewalk width.
- Underpasses should have a daytime illuminance minimum of 10 fc achievable through artificial and/or natural light provided through an open gap to sky between the two sets of highway lanes, and a night time level of 4 foot-candle.
- In underpasses, where vertical clearance allows, the pedestrian walkway should be separated from the roadway by more than a standard curb height.
- Consider acoustics measures within underpasses to reduce noise impacts to pedestrians and bicyclists.

Cost[1]:

Varies greatly from $500,000 to $4,000,000

Roundabouts

A roundabout is a circular intersection that maneuvers traffic around in a counterclockwise direction so that cars make a right-hand turn onto a desired street[1]. Vehicles from approaching streets are generally not required to stop although approaching vehicles are required to yield to motorists in the roundabout. It is believed that this system eliminates certain types of crashes at traditional intersections.

Roundabout design can become quite problematic in dealing with pedestrian and bicycle use. Every effort must be made to prompt motorists to yield to pedestrians crossing the roundabout. A low design speed is required to improve pedestrian safety. Splitter islands and single lane approaches both lend to pedestrian safety as well as other urban design elements discussed in this chapter.

Problems also arise with the vision-impaired because there are not proper audible cues associated with when to cross. Studies are underway to develop and test solutions. Auditory accessible pedestrian signals placed on sidewalks and splitter islands are one solution, but again there is no research to prove their efficacy[1].

In areas where traffic is low, a roundabout presents little in the way of a barrier for bicyclists. However, in multi-lane roundabouts where speeds are higher, and the traffic is heavy, bicyclists are at a distinct and dangerous disadvantage. Adding a bike lane within such a roundabout has not proven to be effective. A possible solution involves creating a bike lane that completely skirts the roundabout allowing the cyclist to use or share the pedestrian route.

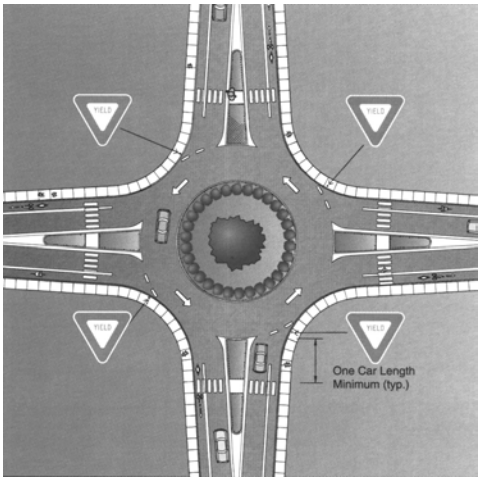


Figure 6(q): Typical roundabout.[3]

Guidelines[11] :

- The recommended maximum entry design speed for roundabouts ranges from 15 mph for 'mini-roundabouts' in neighborhood settings, to 20 mph for single-lane roundabouts in urban settings, to 25 mph for single-lane roundabouts in rural settings.
- Refer to roundabout diagram for typical crosswalk placement.
- Please refer to FHWA's report, Roundabouts, an Information Guide, available online through: www.tfhrc.gov The report provides information on general design principles, geometric elements, and provides detailed specifications for the various types of roundabouts.

Cost[1]:

Neighborhood intersection, landscaped: $45,000 - $150,000

Arterial, landscaped $250,000

Lower maintenance cost than traditional signals

Signalization

Traffic Signals

Traffic signals assign the right of way to motorists and pedestrians and produce openings in traffic flow, allowing pedestrians time to cross the street[1 4]. When used in conjunction with pedestrian friendly design, proper signalization should allow for an adequate amount of time for an individual to cross the street. The suggested amount of pedestrian travel speed recommended in the Manual on Uniform Traffic Control Devices (MUTCD) is 4ft/sec however this does not address the walking speed of the elderly or children. Therefore it is suggested that a lower speed of 3.5ft/sec be used whenever there are adequate numbers of elderly and children using an area.

Figure 6(r): International symbols used in a crosswalk to designate WALK and DON'T WALK[1].

Engineering, as well as urban design judgment, must be used when determining the location of traffic signals and the accompanying timing intervals. Although warrants for pedestrian signal timing have been produced by the MUTCD, each site must be analyzed for factors including new facility and amenity construction (i.e. a popular new park or museum) to allow for potential future pedestrian traffic volume. In addition, creating better access to existing places may in fact generate a higher pedestrian volume[1].

Fixed timed sequencing is often used in high traffic volume commercial or downtown areas to allow for a greater efficiency of traffic flow. In such instances, the pedestrian speed must be carefully checked to ensure safety.

Pedestrian Signals

There are a host of possible traffic signal enhancement opportunities that can greatly improve the safety and flow of

pedestrian traffic. Some include: international symbols for WALK and DON'T WALK, providing large traffic signals, the positioning of traffic signals so that those waiting at a red-light cannot see the opposing traffic signal and anticipate their own green-light, installing countdown signals to provide pedestrians information on how long they have remaining in the crossing interval, automatic pedestrian sensors, and selecting the proper signal timing intervals[1].

According to the MUTCD, international pedestrian signal indication should be used at traffic signals whenever warranted[1]. As opposed to early signalization that featured "WALK" and "DON'T WALK", international pedestrian symbols should be used on all new traffic signal installations as illustrated in Figure 6(r). Existing "WALK" and "DON'T WALK" signals should be replaced with international symbols when they reach the end of their useful life.

Symbols should be of adequate size, clearly visible, and, in some circumstances, accompanied by an audible pulse or other messages to make crossing safe for all pedestrians. Consideration should be paid to the noise impact on the surrounding neighborhoods when deciding to use audible signals[1]. For additional information on accessible pedestrian signals, please visit: www.walkinginfo.org/aps.

Figure 6(s):
Audible cues can be used along with a countdown signal for pedestrians.

Audible cues can also be used to pulse along with a countdown signal. Countdown signals are pedestrian signals that show how many seconds the pedestrian has remaining to cross the street. The countdown can begin at the beginning of the WALK phase, perhaps flashing white or yellow, or at the beginning of the clearance, or DON'T WALK phase, flashing yellow as it counts down.

The timing of these or other pedestrian signals needs to be adapted to a given situation. There are three types of signal timing generally used: *concurrent*, *exclusive*, and *leading pedestrian interval* (LPI). The strengths and weaknesses of each will be discussed with an emphasis on when they are best employed.

Concurrent signal timing refers to a situation where motorists

running parallel to the crosswalk are allowed to turn into and through the crosswalk, left or right, after yielding to pedestrians. This condition is not considered as safe as some of the latter options, however this type of signal crossings generally allows for more pedestrian crossing opportunities and less wait time. In addition, traffic is allowed to flow a bit more freely. *Concurrent* signal timing is best used where lower volume turning movements exist[1].

Where there are high-volume turning situations that conflict with pedestrian movements, the *exclusive* pedestrian interval is the preferred solution. The *exclusive* pedestrian intervals stop traffic in all directions. In order to keep traffic flowing regularly, there is often a greater pedestrian wait time associated with this system. Although it has been shown that pedestrian crashes have been reduced by 50% in some commercial or downtown areas by using these intervals, the long wait times can encourage some to attempt a cross when there is a perceived lull in traffic[1]. These types of crossings are dangerous and may negate the use of the system. A problem is also created for those with visual impairments when the audible cues of the passing parallel traffic is eliminated. Often an audible signal will have to accompany a WALK signal[1].

A proven enhancement that prevents many of the conflicts addressed under either of the former methods is LPI. An LPI works in conjunction with a *concurrent* signal timing system and simply gives the pedestrian a few seconds head start on the parallel traffic. An advance walk signal is received prior to a green light for motorists. This creates a situation where the pedestrian can better see traffic, and more importantly, the motorists can see and properly yield to pedestrians[1]. Long-term research has shown that this system has worked well in places like New York City (where it has been used for 20 years) at reducing motorist and pedestrian conflict[1]. As with the *exclusive* pedestrian interval, an audible cue will need to accompany the WALK signal for the visually impaired.

The use of infrared or microwave pedestrian detectors has increased in many cities worldwide. Theses devices replace the traditional push-button system. Although still experimental, they appear to be improving pedestrian signal compliance as

well as reducing the number of pedestrian and vehicle conflicts[1]. Perhaps the best use of these devices is when they are employed to extend crossing time for slower moving pedestrians. Whether these devices are used or the traditional push-button system is employed, it is best to provide instant feedback to pedestrians regarding the length of their wait. This is thought to increase and improve pedestrian signal compliance.

Guidelines[3,9]:

- Pedestrian signals should be placed in locations that are clearly visible to all pedestrians.
- Larger pedestrian signals should be utilized on wider roadways, to ensure readability.
- Pedestrian signal pushbuttons should be well-signed and visible.
- Pedestrian signal pushbuttons should clearly indicate which crossing direction they control.
- Pedestrian signal pushbuttons should reachable from a flat surface, at a maximum height of 3.5 feet and be located on a level landing to ensure ease of operation by pedestrians in wheelchairs.
- Walk intervals should be provided during every cycle, especially in high pedestrian traffic areas.

Cost[1]:

Traffic signals:	$20,000 - $140,000
Pedestrian signals:	$5,000
Adjusting signal timing requires a few hours of staff time	

Right Turn on Red Restrictions

Introduced in the 1970's as a fuel saving technique, the *Right Turn on Red* (RTOR) law is thought to have had a detrimental effect on pedestrians[1]. The issue is not the law itself but rather the relaxed enforcement of certain caveats within the law such as coming to a complete stop and yielding to pedestrians. Often motorists will either nudge into a crosswalk to check for oncoming traffic without looking for pedestrians or slow, but not stop, for the red-light while making the turn.

Figure 6(t):
A low cost sign that restricts right-hand turns at a red light[1].

There is legitimate concern that eliminating an RTOR will only increase the number of right-turn-on-green conflicts where all of the drivers who would normally have turned on red, now are anxious to turn on green. As discussed in the prior section, LPI or

exclusive pedestrian intervals my help to alleviate this problem. Eliminating RTOR should be considered on a case-by-case basis and only where there are high pedestrian volumes. This can be done by simple sign postings as illustrated in Figure 6(o).

Cost[1]:

Signage, installed: $230 - $350

Landscaping

The introduction of vegetation in an urban environment can provide a welcomed intervention of nature into a place that is otherwise hardened from buildings, concrete, and asphalt. It can be used to provide a separation buffer between pedestrians and motorists, reduce the width of a roadway, calm traffic by creating a visual narrowing of the roadway, enhance the street environment, and help to generate a desired aesthetic.

Figure 6(u):
Landscaping used on the Sea Street in Seattle, Washington shows how stormwater treatment can be tied to aesthetically pleasing plantings[7].

Street trees and other plantings provide comfort, a sense of place, and a more natural and inviting setting for pedestrians. Landscaping and the aforementioned street furniture make people feel welcome

There are also some instances where islands of vegetation are created to collect and filter stormwater from nearby streets and

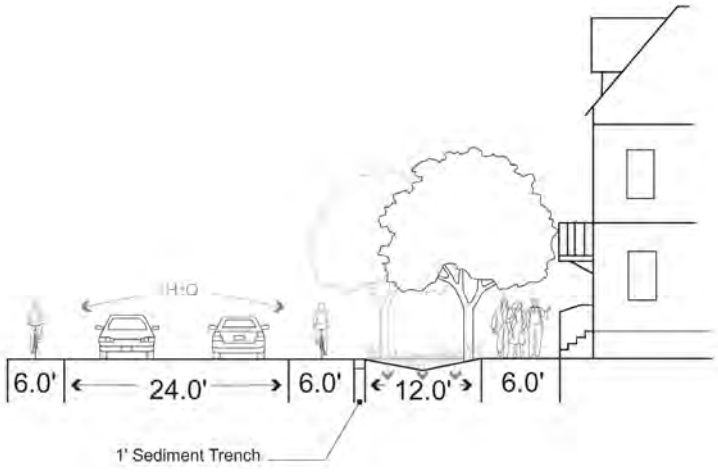


Figure 6(v):
A bioswale can also be used as a vegetated buffer for pedestrians while reinforcing the idea of corridors functioning as their own special event.

buildings. These islands are referred to as constructed wetlands, rain gardens, and/or bioswales. When these devices are employed, the benefits listed above are coupled with economic and ecologic benefits of treating stormwater at its source. There are many examples of this in Oregon and Washington, particularly Seattle's Green Streets Program. Using thoughtful design to treat stormwater as an amenity rather than waste to be disposed of in an environmentally harmful manner is gaining popularity nationwide.

An issue with this or any landscaping treatment is that of ongoing maintenance. The responsibility often falls on local municipalities although there are instances where local community groups have provided funding and volunteers for maintenance. The best way to address the maintenance issue is to design using native plant material that is already adapted to the local soil and climate. Growth pattern and space for maturation, particularly with larger tree plantings, are important to avoid cracking sidewalks and other pedestrian obstructions.

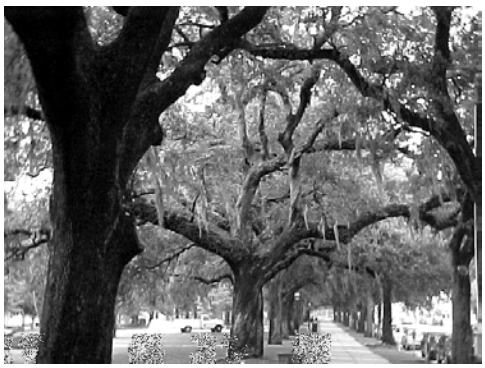


Figure 6(w):
Street trees buffer and soften often harsh urban environments in a number of psychological, physical, and ecological ways[10].

Guidelines[3]:

- Buffer zone plantings should be maintained at no higher than three feet to allow sight distance for motorists and pedestrians.
- Trees with large canopies planted between the sidewalk and street should generally be trimmed to keep branches at least seven feet above the sidewalk.
- Plants and trees should be chosen to match character of area.

Cost[1]:

Varies greatly. May be supplemented by funds from community organizations or homeowners associations.

Roadway Lighting Improvements

Proper lighting in terms of quality, placement, and sufficiency can greatly enhance a nighttime urban experience as well as create a safe environment for motorists and pedestrians. Two-thirds of all pedestrian fatalities occur during low-light conditions[3]. Attention should be paid to crossings so that there is sufficient ambience for motorists to see pedestrians. To be most effective, lighting should be consistent, adequately spaced, and distinguished, providing adequate light.

In most cases, roadway street lighting can be designed to illuminate the sidewalk area as well. The visibility needs of both pedestrian and motorist should be considered. In commercial or downtown areas and other areas of high pedestrian volumes, the addition of lower level, pedestrian-scale lighting to streetlights with emphasis on crossings and intersections may be employed to generate a desired ambiance. A variety of lighting choices include mercury vapor, incandescent, or less expensive high-pressure sodium lighting for pedestrian level lighting[1]. Roadway streetlights can range from 20-40 feet in height while pedestrian-scale lighting is typically 10-15 feet.

It is important to note that every effort should be made to address and prevent light pollution. Also known as photo pollution, light pollution is "excess or obtrusive light created by humans"[4]. Whenever urban improvements are made where lighting is addressed, a qualified lighting expert should be consulted early in the process. This individual should not only create a safe and attractive ambiance, but will do so with the minimum of fixtures, an awareness of the importance of minimizing photo pollution, and with a focus on minimizing future energy use. A thoughtful plan of how and where to light will reap benefits not only in potential reduced infrastructure cost, but future energy costs as well.

Guidelines[9]:

- Ensure pedestrian walkways and crossways are sufficiently lit.
- Consider adding pedestrian-level lighting in areas of higher pedestrian volumes, Downtown, and at key intersections.
- Install lighting on both sides of streets in commercial districts.
- Use uniform lighting levels.

Cost[1]:

Varies greatly depending on design, fixture selection, and public utility

Street Furniture and Walking Environment

As part of a comprehensive sidewalk and walkway design, all street furniture should be placed in a manner that allows for a safe, pleasurable, and accessible walking environment. Good-quality street furniture will show that the community values its public

spaces and is more cost-effective in the long run. Street furniture includes benches, trash bins, signposts, newspaper racks, water fountains, bike racks, restaurant seating, light posts, and other ornaments that are found within an urban street environment. Street furniture should mostly be considered in the Downtown area and other important pedestrian-active areas.

In addition to keeping areas free of obstruction from furniture, a walking environment should be clean and well maintained. Attention should be given to removing debris, trimming vegetation, allowing for proper stormwater drainage, providing proper lighting and sight angles, and repairing or replacing broken or damaged paving material can make an enormous difference in pedestrian perception of safety and aesthetics. Special attention should be paid to the needs of the visually impaired so that tripping hazards and low hanging obstructions are removed.

Figure 6(x):
The street furniture shown here is placed in such a manner so as to create a safe, pleasurable, and accessible walking environment[1].

Guidelines[3]:

- Ensure proper placement of furniture; do not block pedestrian walkway or curb ramps or create sightline problems.
- Wall mounted Objects = not to protrude more than 4" from a wall between 27" and 7' from the ground
- Single post mounted Objects = not to protrude more than 4" from each side of the post between 27" and 7' from the ground
- Multiple Post Mounted Objects = lowest edge should be no higher than 27" and no lower than 7'
- Place street furniture at the end of on-street parking spaces rather than in middle to avoid vehicle-exiting conflict.

Cost[1]:

Varies depending on design, furniture selection, material, and level of landscaping

Transit Stop Treatments

Currently the Town of Holly Springs is not served by any public transportation. In the event that such an opportunity is made available to the Town, it is appropriate to consider some of the basic elements of a well designed, accessible, and functional transit stop.

Bus or other transit stops should be located in places that are most

Figure 6(y):
This typical transit stop has all of the key features of shelter, ample seating, bicycle parking, landscaping, and trash bins[1].

suitable for the passengers. For example, stops should be provided near higher density residential areas, commercial or business areas, and schools, and connected to these areas by sidewalk. Some of the most important elements to consider are the most basic: sidewalk connectivity to the stops, proper lighting, legible and adequate transit stop signage, shelter, seating, trash bins, bicycle and even car parking. Transit stops create an area of activity and may generate additional business and pedestrian traffic. Therefore an opportunity is created to provide adequate sidewalks and other pedestrian oriented design elements. At a minimum, marked crosswalks (especially at mid-block stops), curb ramps, and proper sidewalk widths should be considered.

As with any human scale design element discussed, safety is an important factor to consider when locating bus stops. In the case of a bus stop, special attention should be paid to the number of lanes and direction of traffic when deciding to locate a stop on the near or far side of an intersection. Also special consideration must be paid to the wheelchair lifts in terms of how and where the mobility impaired will exit and enter the bus.

Cost[1]:

Can vary greatly from $1,000 to $10,000

Pedestrian Signs and Wayfinding

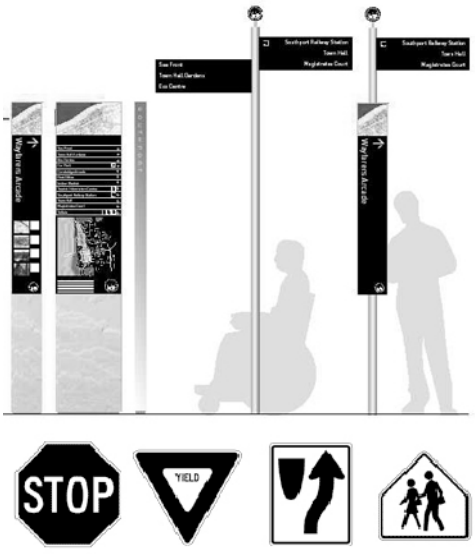


Figure 6(z):
Wayfinding signs promote aesthetics as well as provide important information[6]. Below are typical traffic signs found around pedestrian friendly places[1].

Signage provides important safety and wayfinding information to motorist and pedestrian residents and tourists. From a safety standpoint, motorists should be given advance warning of upcoming pedestrian crossings or of traffic calming areas. Signage of any type should be used and regulated judiciously. An inordinate amount of signs creates visual clutter. Under such a condition, important safety or wayfinding information may be ignored resulting in confusion and possible pedestrian vehicle conflict. Regulations should also address the orientation, height, size, and sometimes even style of signage to comply with a desired local aesthetic.

Wayfinding signage should orient and communicate in a clear, concise and functional manner. It should enhance pedestrian circulation and direct visitors and residents to important destinations. In doing so, the goal is to increase the comfort of

MUTCD Pedestrian-Related Signage

Regulatory Signs

R1-5 R1-5a R1-6 R1-6a R5-10b R5-10c R9-1 R9-2

R9-3a R9-4 R9-4a R9-6 R10-4b

School, Warning, and Informational Signs

S1-1 S3-1 W11-2 W15-1 I-4

Sign	MUTCD Code	MUTCD Section	Conventional Road	
Yield here to Peds	R1-5	2B.11	450x450 (18x18)	Regulatory
Yield here to Peds	R1-5a	2B.11	450x600 (18x24)	
In-Street Ped Crossing	R1-6, R1-6a	2B.12	300x900 (12x36)	
Peds and Bikes Prohibited	R5-10b	2B.36	750x450 (30x18)	
Peds Prohibited	R5-10c	2B.36	600x300 (24x12)	
Walk on Left Facing Traffic	R9-1	2B.43	450x600 (18x24)	
Cross only at Crosswalks	R9-2	2B.44	300x450 (12x18)	
No Ped Crossing	R9-3a	2B.44	450x450 (18x18)	
No Hitch Hiking	R9-4	2B.43	450x600 (18x24)	
No Hitch Hiking (symbol)	R9-4a	2B.43	450x450 (18x18)	
Bikes Yield to Peds	R9-6	9B.10	300x450 (12x18)	
Ped Traffic Symbol	R10-4b	2B.45	225x300 (9x12)	
School Advance Warning	S1-1	7B.08	900x900 (36x36)	School, Warning, informational
School Bus Stop Ahead	S3-1	7B.10	750x750 (30x30)	
Pedestrian Traffic	W11-2	2C.41	750x750 (30x30)	
Playground	W15-1	2C.42	750x750 (30x30)	
Hiking Trail	I-4	--	600x600 (24x24)	

1. Larger signs may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.
3. First dimension in millimeters; dimensions in parentheses are in inches.
4. All information in table taken directly from MUTCD.

visitors and residents while helping to convey a local identity[5].

Maintenance of signage is as important as walkway maintenance. Clean, graffiti free, and relevant signage enhances guidance, recognition, and safety for pedestrians.

Cost[1]:

Signage: $50 - $150 plus installation

Bridges

Provisions should always be made to include a walking facility as a part of vehicular bridges, underpasses, or tunnels, especially if the facility is part of the Pedestrian Network. All new or replacement bridges, other than those for controlled access roadways, should accommodate pedestrians with wide sidewalks on both sides of the bridge. Even though bridge replacements do not occur regularly, it is important to consider these in longer-term pedestrian planning.

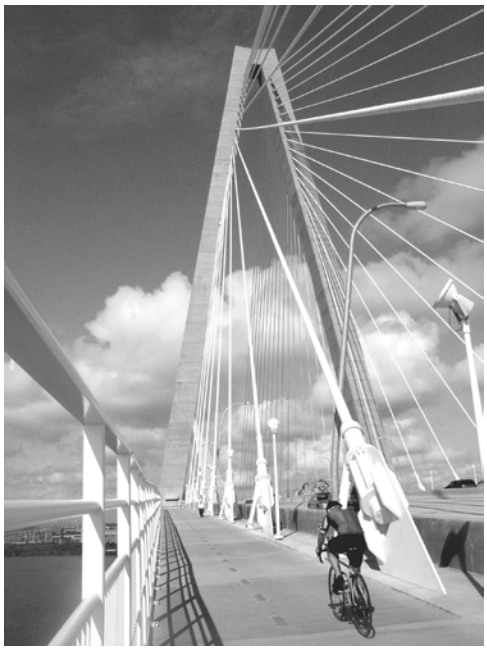


Figure 6(aa): Sidewalks or multi-use trails should be included as part of vehicular bridge designs.

It is NCDOT bridge policy that within Urban Area boundaries, sidewalks shall be included on new bridges with curb and gutter approach roadways with no controlled access. Sidewalks should not be included on controlled access facilities. A determination on whether to provide sidewalks on one or both sides of new bridges will be made during the planning process according to the NCDOT Pedestrian Policy Guidelines. When a sidewalk is justified, it should be a minimum of five to six feet wide with a minimum handrail height of 42".

It is also NCDOT bridge policy that bridges within the Federal-aid urban boundaries with rural-type roadway sections (shoulder approaches) may warrant special consideration. To allow for future placement of ADA acceptable sidewalks, sufficient bridge deck width should be considered on new bridges in order to accommodate the placement of sidewalks.

Additional Information:

http://www.ncdot.org/doh/construction/altern/value/manuals/RDM2001/part1/chapter6/pt1ch6.pdf

http://www.ncdot.org/doh/construction/altern/value/manuals/bpe2000.doc

Guidelines:

- Sidewalks should be included on roadway bridges with no

controlled access with curb and gutter approach in Urban Areas.

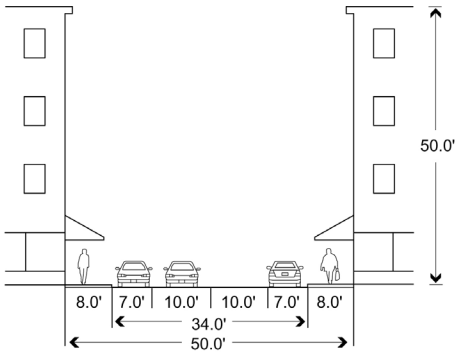
- Sufficient bridge deck width should be considered on new bridges with rural-type shoulder approaches for future placement of sidewalks.
- Sidewalk should be 5' to 6' wide.
- Minimum handrail height should be 42''

6.2 Typical Cross-Sections

Context, dimension, and scale are important considerations when developing new or retrofitting existing pedestrian friendly environments. Context refers generally to the place: is it urban, rural, residential, commercial, industrial or mixed? Dimension relates to the actual size and distance of objects such as buildings. Scale relates to how both context and dimension work together within a given locality. It is often a subjective observation based on the feeling generated while occupying a space. A place that is not scaled properly will most likely feel uncomfortable, while those that are will be more pleasurable. According to the American Planning Association, some important factors within a pedestrian environment are[8]:

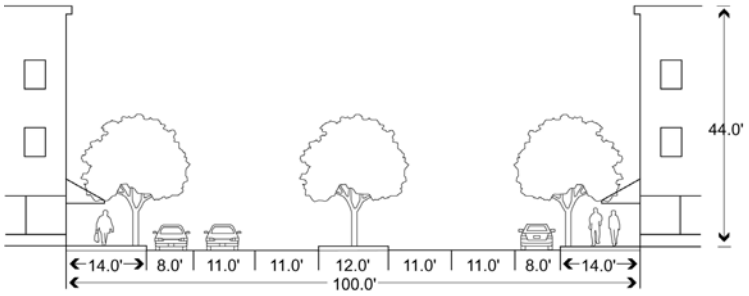
- parking configuration
- building use
- degree/type of non-motorist activity
- truck traffic percentage
- ADA requirements
- location within the urban fabric
- transit use

Figure 6 (bb):
With a building ratio of 1:1, where the building heights are the same as the distance between them, a sense of enclosure is established quite easily. Depending on traffic requirements, the space can be used for tree plantings, bike lanes, wider sidewalks, or a combination of those elements[8].



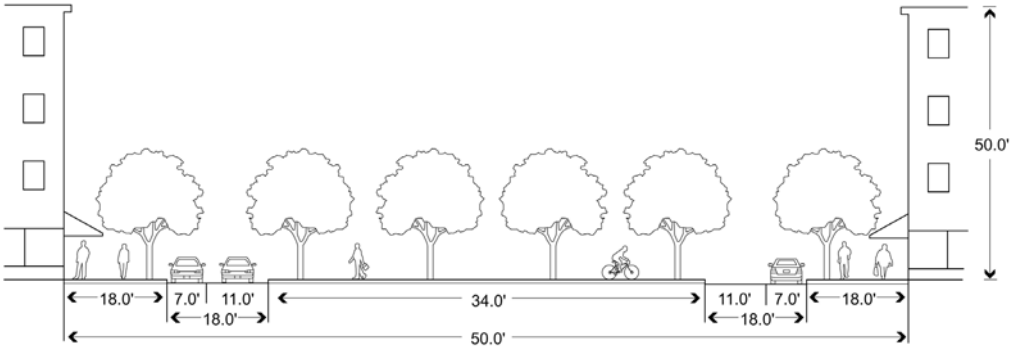
1:1 Ratio

Figure 6(cc):
A building ratio of 2:1 where the building heights are half of the distance between them, requires the addition of other elements to help maintain a sense of enclosure and to reinforce the notion of human scale, and pedestrian friendly environments[8].

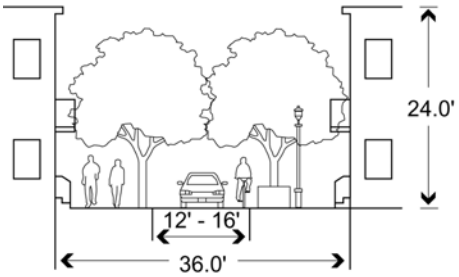


2:1 Ratio

Figure 6(dd):
A ratio of 3:1 approaches the maximum distance between buildings before the building edges cease to relate to each other. Any ratio larger than 4:1 starts to lose a perception of enclosure and should be avoided if at all possible[8].

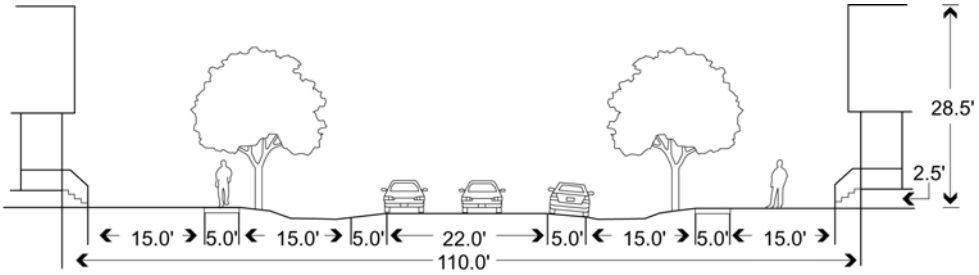


3:1 Ratio



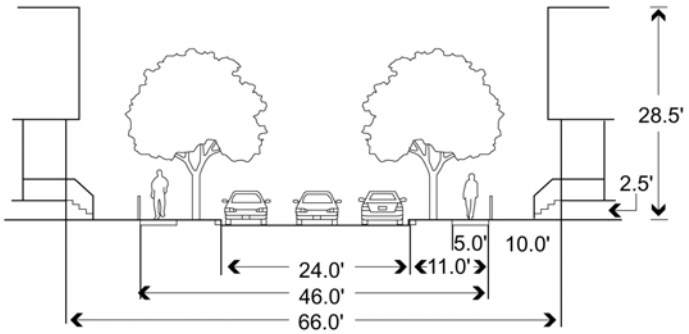
Woonerf

Figure 6(ee):
Woonerfs, otherwise know as, Home Zones, are planned communities where the pedestrian is given precedence over the automobile. The streets meander as does the paving material so that the motorist must travel slowly and cautiously. Building proportions are generally at a 1:1.5 max. Residential and mixed use buildings front the often tree lined streets. These neighborhood designs create interesting and innovative opportunities for interactions of public and private space [8].



Low ADT Yield Street

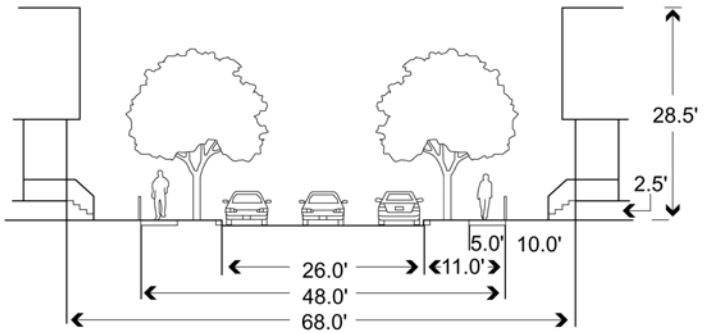
Figure 6(ff):
In a more rural area, the Low ADT Yield Street is appropriate given the often immense building ratio of between 4:1 and 5:1. These areas are often defined by low density residential use with open drainage



Edge Yield Street

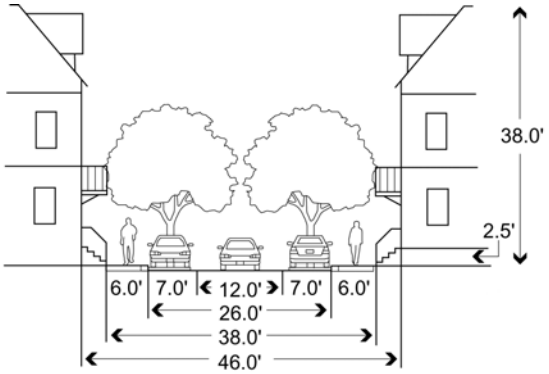
Figure 6(gg):
The Edge Yield Street is recommended for the center or edge of neighborhood. The blocks should be short and consist mostly of single family detached housing. The building separation ratio is at a 3:1 or 4:1 max[8].

Figure 6(hh):
The AASHTO Recommended Street is a highly desirable form of a residential neighborhood where the Woonerf is not appropriate. Parking needs must be addressed however alleys may serve as opportunities for vehicle and building access. These neighborhoods feature closed drainage, street trees (preferably native species), and offset sidewalks[8].



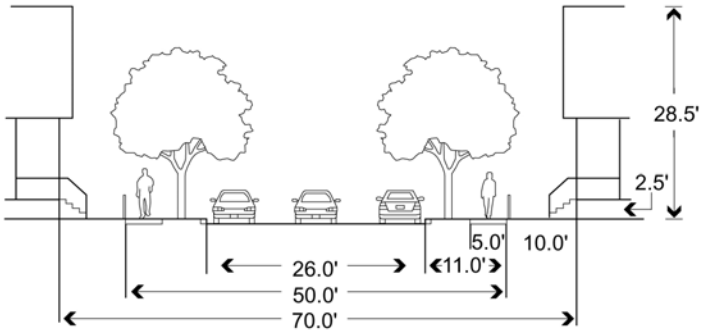
AASHTO Recommended Residential Street

Figure 6(ii):
This variation of the AASHTO Recommended Residential Street, recognizes higher density, larger residential buildings and a reduced building ratio. This can be used in areas with slower traffic and lower parking densities[8].

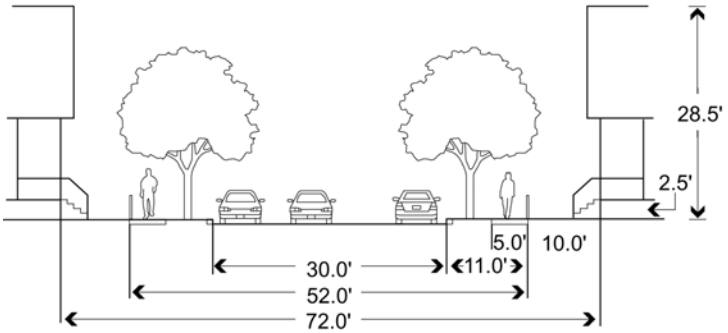


Modified AASHTO Residential Street

Figure 6(jj):
The Yield Street maintains a building ratio of 3:1 while allowing for an opportunity, in lower density environments, to detach the sidewalks. These streets consist of a mix of detached or attached residential and sometimes commercial or live/work buildings. The character, for the most part, remains residential[8].



Yield Street



Non Yield Street

Figure 6(kk):
This illustration is not entirely indicative of a Yield Street but begins to offer some of what is intended in their use. The travel lanes of a Yield Street are narrower than shown. These are predominantly residential streets of multistory buildings, a mix of land use and truck traffic. It calls for a building ratio of 3:1 and allows for both parallel and diagonal parking[8].

6.4 Local Pedestrian Facility Improvements - Conceptual Renderings

The following pages contain some examples of conceptual retrofits that may be available to the Town of Holly Springs when considering pedestrian enhancements.

Figure 6(ll):
BEFORE
Poorly marked trail which is not accessible.

Figure 6(mm):
AFTER
Ten foot, paved, multi-use trail added along with signage .

Figure 6(nn):
BEFORE
Lack of safe, unobstructed pedestrian walkway. Existing sidewalk is disconnected.

Figure 6(oo):
AFTER
A sidewalk was added with landscaped vegetated buffers. Native juniper and shortleaf pines were used. Shortleaf pines were added to create interest and soften the urban environment.

Figure 6(pp):
BEFORE
A poorly marked crosswalk may not give enough of a clue to drivers to slow down.

Figure 6(qq):
AFTER
By using ladder style makings, the perpendicular lines catch driver's attention.

Footnotes

[1] Walkinginfo.org. [Internet]. Chapel Hill, NC: Pedestrian and Bicycle Information Center . (cited 2005 May 2). Available from http://www.walkinginfo.org/

[2] Georgia Department of Transportation. (2003). *Pedestrian Streetscape and Guide*

[3] Association of State Highway and Transportation Officials. (2004). *Guide for the Planning, Design, and Operation of Pedestrian Facilities*.

[4] The Free Dictionary. [Internet]. Huntingdon Valley, PA: Farlex, Inc. (cited 2005 May 1). Available from http://encyclopedia.thefree dictionary.com/light%20pollution

[5] City of Portland, Office of Transportation. [Internet]. Portland OR : The City of Portland. (cited 2005 May 3). Available from http: //www.portlandonline.com/transportation/?c=eafaa

[6] Sefton Council. [Internet]. Sefton, UK: Sefton Council. (cited 2006 May 4) . Available from http://www.sefton.gov.uk/images/new%20s ign%20proposals.jpg

[7] Seattle.gov. [Internet]. Seattle, WA: Seattle Public Utilities. (cited 2006 May 4). Available from http://www.ci.seattle.wa.us/util/Ab out_SPU/Drainage_&_Sewer_System/Natural_Drainage_Systems/ Street_Edge_Alternatives/COS_004467.asp

[8] American Planning Association . 2006. Planning and urban design standards. Hooken, NJ: John Wiley & Sons, Inc. 719 p.

[9] Metro [Internet]. Portland, Oregon: Transportation Information Center . (cited 2005 May 2). Guidebook available from http:// www.metro-region.org/article.cfm?ArticleID=262

[10] Photo courtesy of www.image03.webshots.com

Appendix A
Public Input

A.0 Overview

In order to gain local knowledge and opinions, a public outreach component was included in the planning efforts for the Holly Springs Pedestrian Master Plan. Public input was gathered through several different means with the chief efforts being public meetings and opinion surveys.

A.1 Public Meetings

Two public meetings were held during the planning process. During these public meetings, public input was taken in the form of map markups and comments and through discussions between citizens, consultant staff from Greenways Incorporated, and Holly Springs staff, from Engineering, the Parks and Recreation Department, and Planning. In addition, a public comment form was developed for Holly Springs and distributed for hand written opinionated responses during the first and second public meeting.

The first public meeting, on April 20th, 2006 at Bass Lake Park, was held to inform the public about the process and gather early input and recommendations. A total of 27 people signed in at the first public meeting.

The second public meeting, on September 9th, 2006 at Womble Park, was held to present preliminary recommendations to the public in order to receive feedback. A total of 50 people attended the second public meeting.

Map and Discussion Comment Results

The hand written comments on the maps were analyzed by consultant staff and taken into consideration during the development of the pedestrian network. Specific segments that were recommended during the Public Meetings, were added as a weight in the determination of segment prioritization (See Appendix B).

Public Meeting 1

The following lists of comment results were taken directly from the hand written comments on the Public Comment Maps from the first Public Meeting. Many of the requests for new or improved sidewalks and trails were along major arterial roadway corridors or between specific housing developments, commercial centers, parks, and downtown.

Sidewalks Requests:

- Raleigh Street (Multiple Requests)
- Grigsby Street (Multiple Requests)
- Holly Springs Road from NC55 to Main Street (fill in gaps)
- Holly Springs Road from Main Street to Grassy Meadow (fill in gaps)
- Main Street (fill in gaps)
- Bass Lake from Earp to Stinson
- Lakeside to Raleigh
- Holly Springs Crossing to Bass Lake
- Salem Ridge to Bass Lake Park (with crosswalk)
- Homegrown Pizza to the Learning Center
- Bass Lake Road from Holly Springs Road to Bass Lake Park
- Holly Springs Road from Raleigh Street to Main Street
- Sunset Ridge on Holly Springs Road to Harris Teeter Shopping Center
- Fill in all gaps on Main Street
- Fill in gaps on Sunset Lake Road
- Holly Springs Road from Linksland to Sunset Lake

Trail/Greenway Requests

- Connect Future Veteran's Park to Jones Park
- Connect greenway in Ballenridge Subdivision under NC55 to Holly Glen/Braxton Village
- Upgrade/Improve greenway in Oakhall Subdivision. Overgrown and broken pavement
- Construct trail from Downtown to Springs
- Greenway from Womble to Bass Lake (3 requests)
- Finish greenway loop around Bass Lake (5 requests)
- Connect greenway in Wescott to Sunset Village Shopping Center
- Connect Wescott to Carrington Estates and Brackenridge

Pointe
- Check on the possibility of a public proposed greenway along sewer line from Carrington Estates/Brackenridge Pointe north to Optimist Farm Road
- Construct Trail Head on Optimist Farm Road and sewer line

Crosswalks
- Bass Lake Road from Crescent Bank to Holly Springs Crossing
- Linksland to Linksland across Holly Springs Road (2 requests)

Intersections
- Sunset Lake and Holly Springs Road (dangerous)
- Wescott and Sunset Lake
- NC 55 Bypass and Main Street on south end of Town – install actuated signal

General
- "Would like places to bike (greenways)"
- "If we can't have a bike lane – perhaps a shoulder for safety"
- Lots of walking traffic on Bass Lake…..dangerous
- Regional pedestrian connections were indicated as the following (CAMPO):
    1. New Hill
    2. Old Smithfield
    3. Sunset Lake
    4. Bass Lake
    5. Holly Springs Road
    6. Cass Holt
    7. Avent Ferry
    8. Old Holly Springs/Apex Road

Public Meeting 2

The following lists of comment results were taken directly from the hand written comments on the Public Comment Maps from the second Public Meeting. Many of these comments were written in agreement to the network that was proposed by the consultant, reiterating the importance of particular recommendations to the community

Sidewalks Requests:
- Sidewalks to Downtown and Shopping
- Fill Gaps along Avent Ferry Road (multiple requests)
- Fill Gaps along Holly Springs Road (multiple requests)
- More Sidewalks around new HS and Elementary School (multiple requests)
- Elm
- Stinson
- South Main Street
- Connect Womble Park to Bass Lake Park (multiple requests)
- Connect to American Tobacco Trail
- New Hill Road
- Bass Lake Road (multiple requests)
- Grigsby (multiple requests)
- Connecting Parks to Neighborhoods to Shopping
- Irving
- Wescott Neighborhood to Holly Springs Road
- Optimist Farm Road to Harris Teeter
- From Windward Pointe to Library
- Holly Springs Business Park-keep business park pedestrian friendly with trees and natural quality of life
- Somerset Farms to Womble and Bass Lake Park and downtown
- Arbor Creek to Town and Main Street

Trail/Greenway Requests
- Utley Creek Greenway
- Business Park Greenway to Subdivisions and downtown
- Pave old Railway line along North Main Street
- Longer Loop Trail around Womble Park
- Greenway around Sunset Lake
- Holly Springs Business Park-keep business park pedestrian friendly with trees and natural quality of life

Intersection:
- Improve Intersection of Elm and Avent Ferry
- Cass Holt at Avent Ferry

Crossings
- Pedestrian Bridge or refuge islands along Holly Springs Road
- Holly Glen to new HS and Elementary School

Other Amenities:
- Night time lighting
- Trash Receptacles
- Doggie Bags

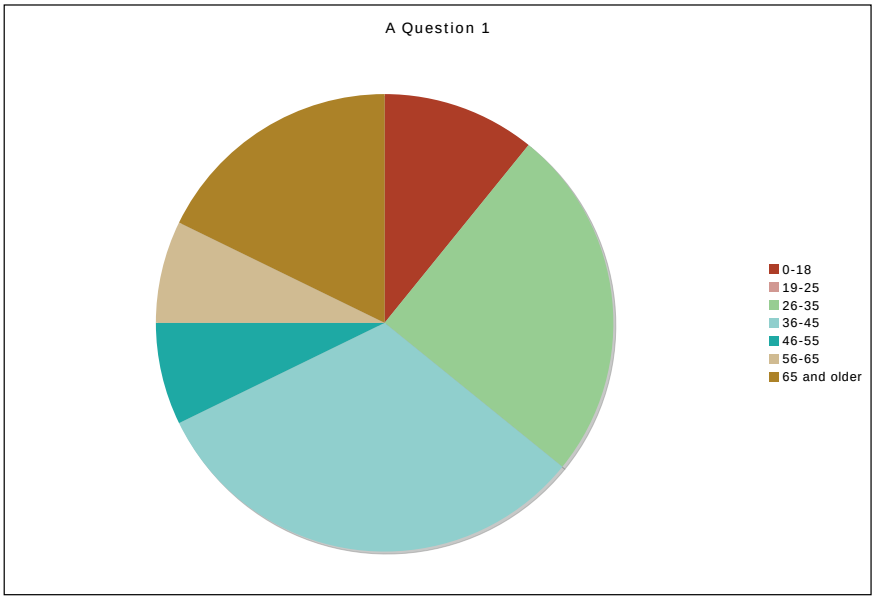
General:
- Start Greenways in town and work out to neighborhoods
- Sidewalks on both sides of all roads
- Health concerns for overweight individuals with the suggestion to create as many sidewalks as possible

Public Comment Form Results

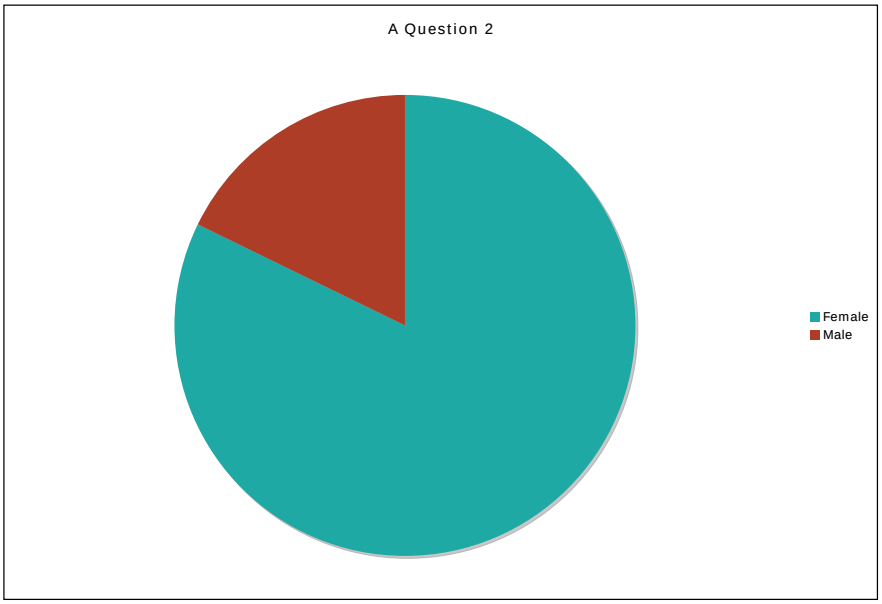
A Public Comment form was distributed at both Public Meetings to incorporate local thoughts and opinions into the preliminary network, before the online survey results were fully tabulated. This gave residents an alternative way to express ideas or concepts to the planning team. Twenty-five people responded to the Public Comment Form. The following section describes the results.

The following graphics were created from the results of each answered question. If a question was skipped by a respondent or unanswered correctly, it was not included in the total number of responses for each option to project the associated graphic.

1. What is your age?

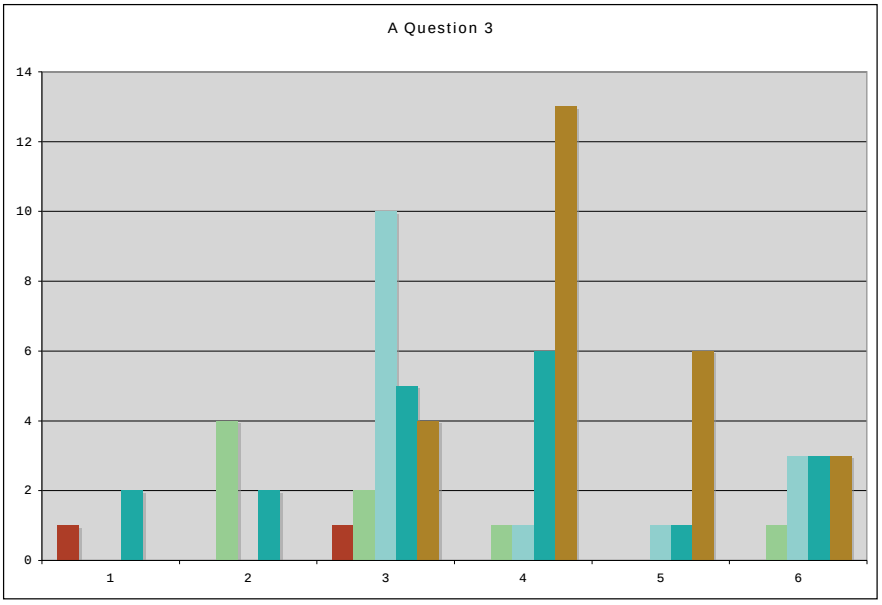


2. What is your sex?



3. How Many Times per month (on average) do you walk for the following purposes?

- To go to work
- To go to school
- For general recreation/exercise
- To attend social activities/events
- To shop or run errands
- Nature Study/appreciation
- Other



The "other" option included the following open ended responses:

- Friend's house down-street
- Pick-up trash and visit friends
- There aren't enough sidewalks to do these things!!! Put them in and I'll do all of the above.
- Exercise

4. Are there places you would like to be able to walk that you cannot at this time?

The following open ended, hand written responses identified specific streets, neighborhoods, and destinations. All of the results are listed below, many were listed more than once.

Streets

West Elm	Grigsby	Cayman
Sunset Fairways Drive	Earp	Optimist Farm
Avent Ferry	Holly Springs Road	Stinson Avenue
Bass Lake Road	Raleigh	Salem Ridge Road
Saranac		

Neighborhoods

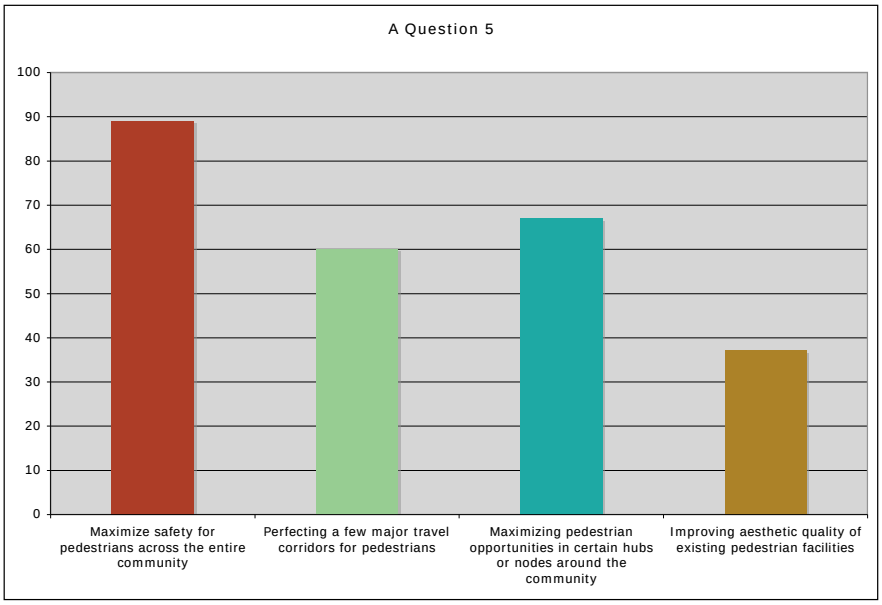
Windward Pointe	Holly Glen	Holly Ridge
Braxton Village	Sunset Ridge	Sunset Ridge South
Sunset Oaks	Home	

Destinations

Hunt Center	Bass Lake Park	Downtown/Town Hall
Library	Autumn Park	La Dolce Vita Restaurant
Lowes/Blockbuster/NY Pizza	Holly Springs Crossing Shopping Center	Food Lion
Sunset Plaza/Harris Teeter	Autumn Park	Womble Park
Lakeside/Bank	Walgreens	Post Office
Shearon Harris Lake	Wendy's	Holly Springs Medical Center
Holly Springs Elementary/High School	Holly Grove Elementary/High School	Holly Springs Chiropractic

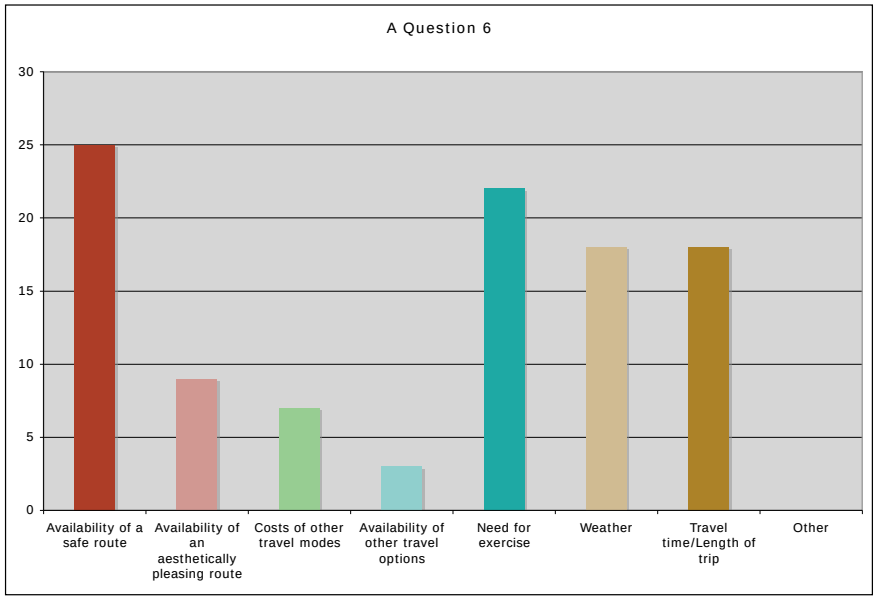
5. Please Order this List according to the importance you place on each item.

- Maximize safety for pedestrians across the entire community
- Perfecting a few major travel corridors for pedestrians
- Maximizing pedestrian opportunities in certain hubs or nodes around the community
- Improving aesthetic quality of existing pedestrian facilities

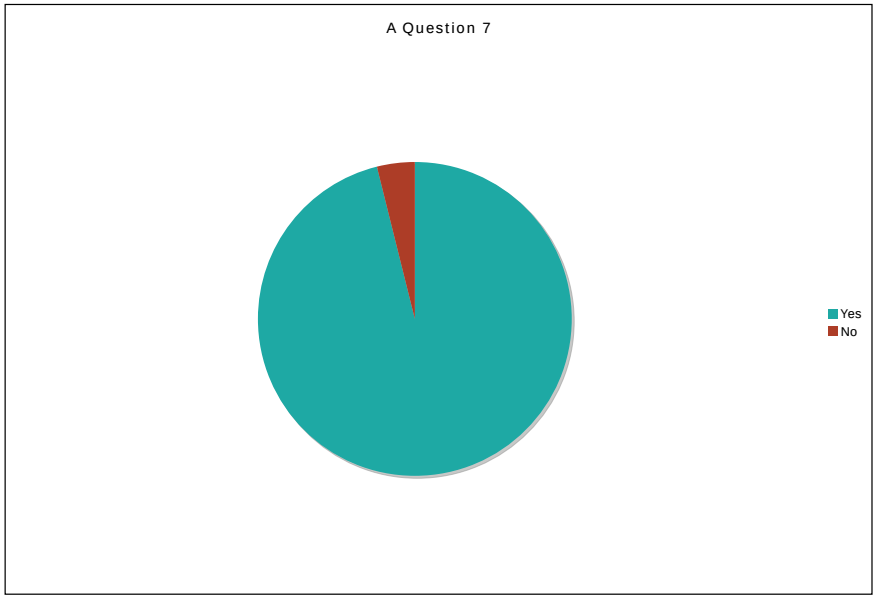


6. Which of the following factors play a role in whether or not you walk to a destination?

- Availability of a safe route
- Availability of an aesthetically pleasing route
- Costs of other travel modes
- Availability of other travel options
- Need for exercise
- Weather
- Travel time/Length of trip
- Other



7. Should Public funds be used to improve pedestrian options and facilities?



8. If yes, what types of funds should be used?

- Existing local taxes
- New local taxes
- State and federal grants
- Other

9. Do you have suggestions about specific programming or pedestrian related policies that you would like to see enacted?

The following open ended, hand written responses are listed below, exactly as they appeared on the comment form.

- Dog poop trash cans
- Walking Trail around Bass Lake
- More sidewalks/trails more promotion of safety in the community (signs, etc.)
- Organized biking
- New sidewalks through out the Holly Springs business area
- Many young couples and others with dogs walk on the streets since there are no sidewalks. At night it is very difficult to see these individuals. Perhaps it should be stipulated that persons after dark should wear clothing that can easily be seen like white or orange.
- I would like to see greenways developed to connect local parks (Womble, Bass Lake, Jones, the Library/Cultural Arts Center) as well as having new/future developments include greenways/greenway access
- More lights Each side of highways
- Sidewalks
- If its possible I think you should enact a signalized pedestrian crosswalks in the intersection into the school. (to make it a safer cross for kids)
- At busy intersections (ie NC55) crosswalks at HSES need better marks/lights
- No
- Minimum sidewalk width of 5 feet. Minimum 5 foot berm between curb and sidewalk on local roads and streets
- Put in sidewalks and allow bikes on them. Put in greenways and hurry!
- 1. Please connect / complete what we currently have 2. Expand "web" of walkways from what is now completed 3. Explore new options

10. Please provide your address below so we can

better understand who was represented at tonight's meeting.

Of the 25 people who responded to the Public Comment Form, 21 people wrote in an address and 4 people left this question blank. The 21 people who responded were from Holly Springs.

A.2 Online Opinion Survey

An online survey was created for Holly Springs through efforts between the Town of Holly Springs staff and consultant staff at Greenways Incorporated. The following survey results have been tabulated by Greenways Inc. to provide insight into local residents' opinions and values. The survey was available online at the Town of Holly Spring's website from April 12th to September 25th, 2006. To maximize the responses to the online survey, the address was distributed at each of the public meetings, in Pedestrian Plan Newsletters, and on flyers throughout the Town. At the close of the survey, a total of 203 of people responded to the online survey.

Questions #7,9,10,11,12, and 13 required respondents to rank options in order to answer the given question. Not all respondents completely answered the question by ranking all of the choices. A minimal margin of error may exist in the results for these questions.

In order to project the results of questions with multiple answers, an order of rank was assigned to each category. Options that were ranked highest were multiplied by the total number of available options. The second choice was multiplied by the total number of options minus one; the third choice was multiplied by the total number of options minus two; etc. The resulting totals were added together to equal the weighted number for projection.

For example, question #7 had 122 respondents choose "Maximizing safety for pedestrians across the entire community" as their first choice; 30 chose it as a second choice; 23 as a third choice; and 11 chose as a fourth choice. The total number of choices or options is four.

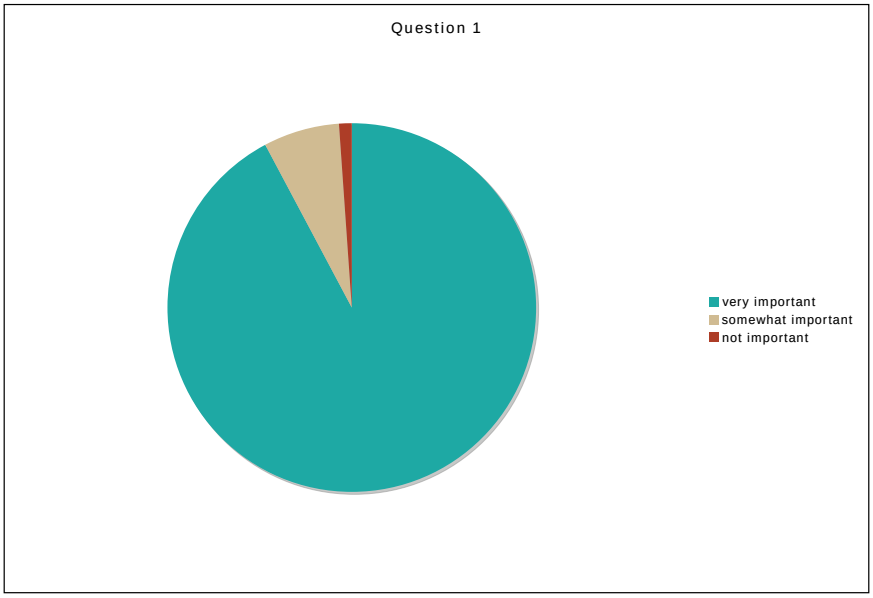
Weighted Projection Number = (122 x 4) + (30 x 3) + (23 x 2) +

(11 x 1) = 635

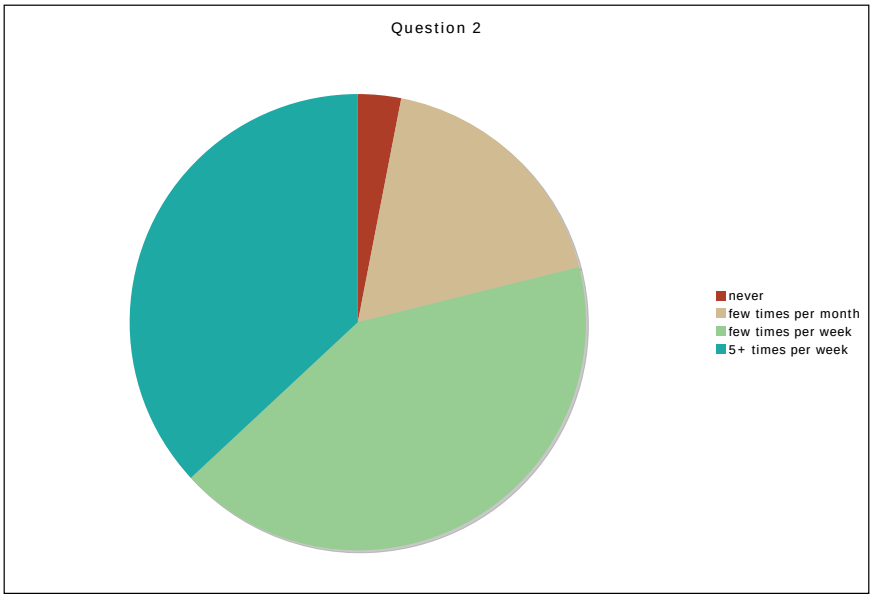
The same formula was used for each option.

	Ranking				
Choices/Options	1	2	3	4	Weighted Projection Number
Maximizing safety for pedestrians across the entire community.	122	30	23	11	635
Perfecting a few major travel corridors for pedestrians.	24	60	69	32	446
Maximizing pedestrian opportunities in certain hubs or nodes around the community.	38	78	50	23	509
Improving aesthetic quality of existing pedestrian facilities.	10	23	43	113	308

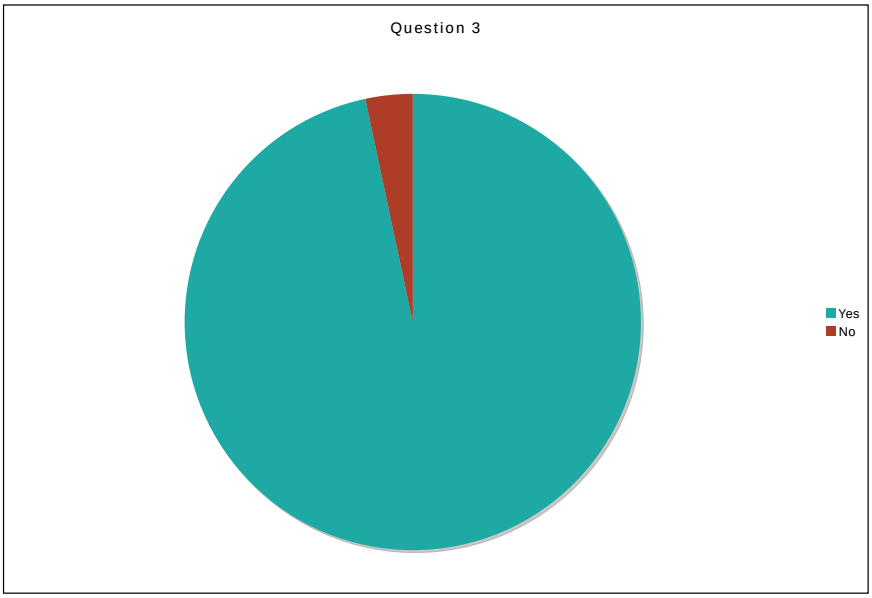
1. How important to you is the goal of creating a walkable community? (select one)



2. How often do you walk now? (select one)

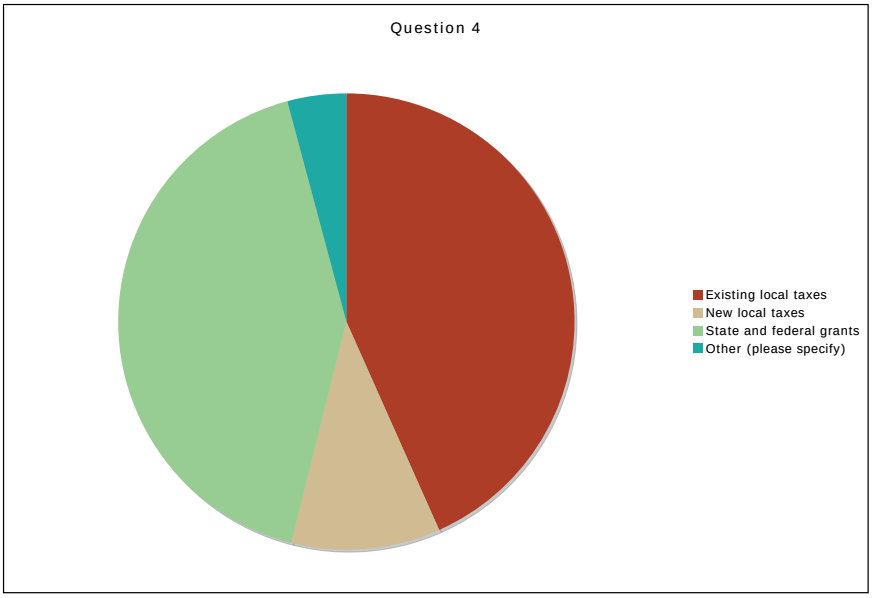


3. Should public funds be used to improve pedestrian options and facilities?



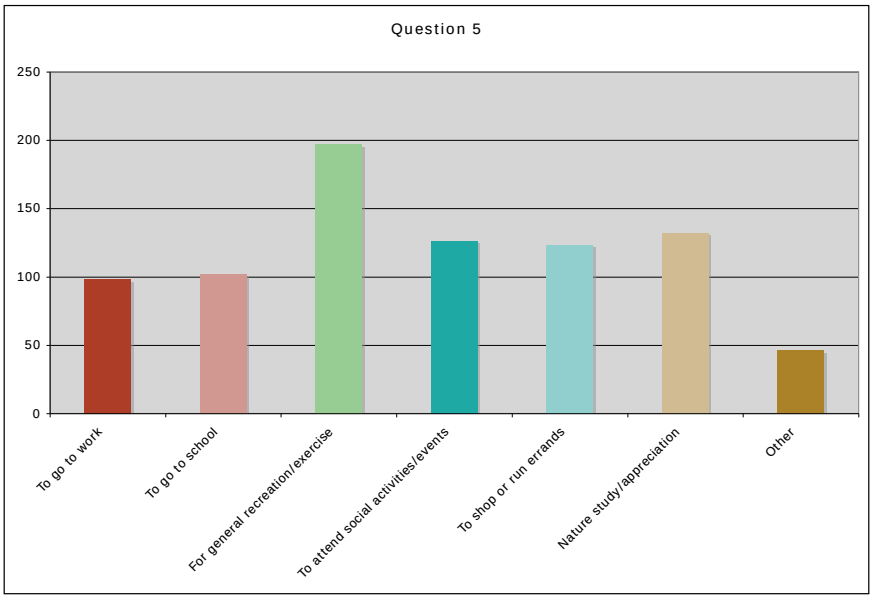
4. What types of funds should be used?

- Existing local taxes
- New local taxes
- State and federal grants
- Other (please specify)



5. How many times per month (on average) do you walk for the following purposes?

- To go to work
- To go to school
- For general recreation/exercise
- To attend social activities/events
- To shop or run errands
- Nature study/appreciation
- Other



6. Are there places you would like to be able to walk that you cannot at this time?

This question was an open-ended question. 168 people typed in a response. The most popular responses for "To"/"From" destinations were similar to the responses of the Public Comment Form from the Public Meetings. The top responses are listed below.

Streets

- Holly Springs Road
- Earp
- Avent Ferry
- Optimist Farm
- Old 55 / Main Street
- Grigsby

Neighborhoods

- Somerset Farm
- Sunset Ridge
- Holly Glen
- Wescott
- Valleyfield
- Woodlands at Oak Hall
- Arbor Creek

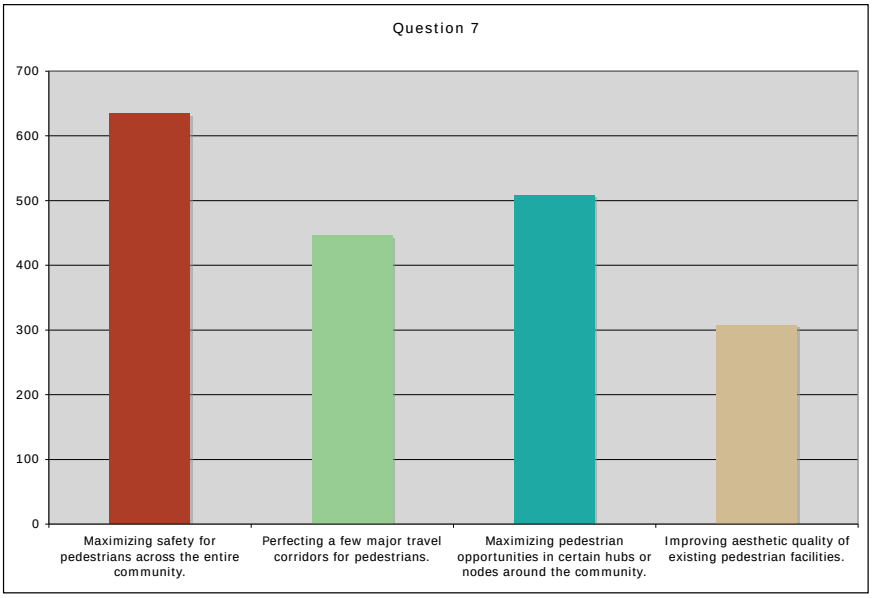
Destinations

- Womble Park
- Bass Lake Park
- Hunt Community Center
- Downtown
- Library
- Post Office
- Schools-various specific names
- Commercial Centers-particularly shopping centers with a grocery store anchor such as Lowe's/Harris Teeter/Food Lion

7. Please order this list according to the importance you place on each item. Rank the options below from 1 (highest importance) to 4 (lowest importance).

- Maximizing safety for pedestrians across the entire community.
- Perfecting a few major travel corridors for pedestrians.
- Maximizing pedestrian opportunities in certain hubs or nodes around the community.
- Improving aesthetic quality of existing pedestrian facilities.

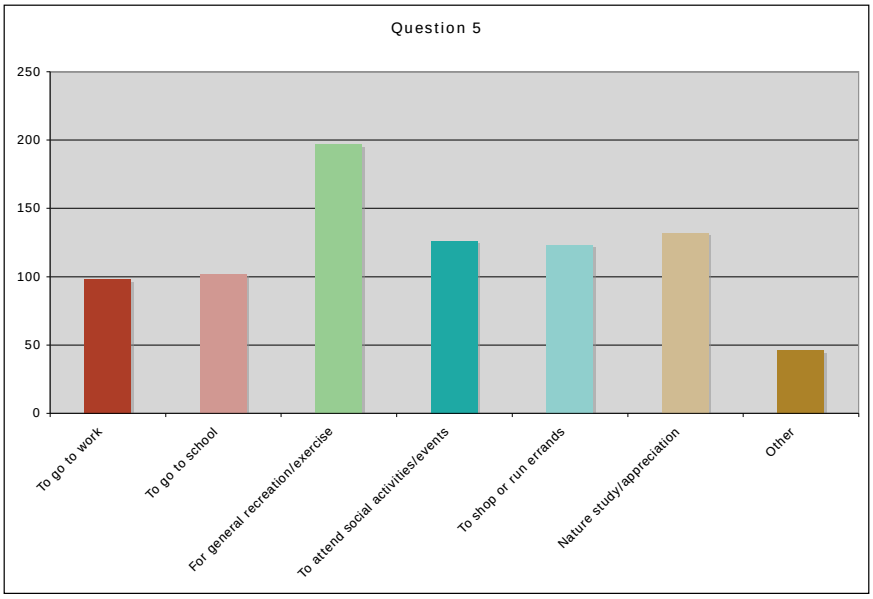
8. Which of the following factors play a role in whether



or not you walk to a destination? (Check as many as apply)

- Availability of a safe route
- Availability of an aesthetically pleasing route
- Costs of other travel modes
- Availability of other travel options
- Need for exercise
- Weather
- Travel time/length of trip
- Other (please specify)

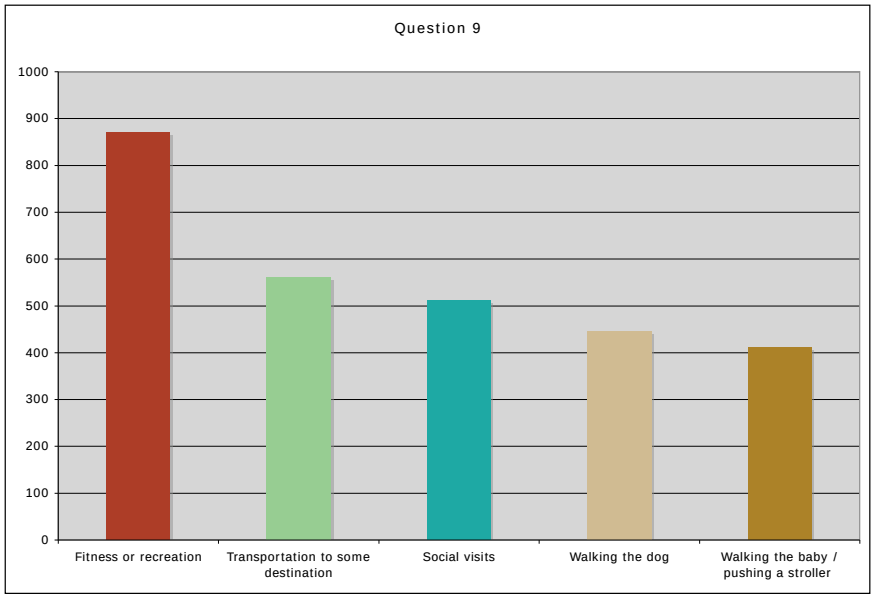
9. For what purposes do you walk most now and/or



would you want to walk for in the future? Please rank in order (1=top choice 5=lowest choice).

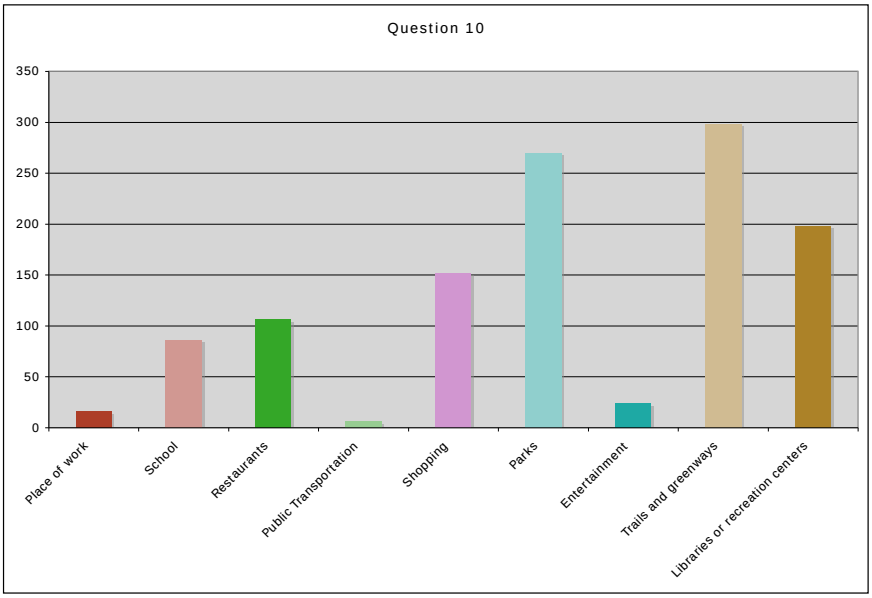
- Fitness or recreation
- Transportation to some destination
- Social visits
- Walking the dog
- Walking the baby / pushing a stroller

10. What walking destinations would you most like to



get to? (Please choose and rank your top 3 with 1 being the most desirable)

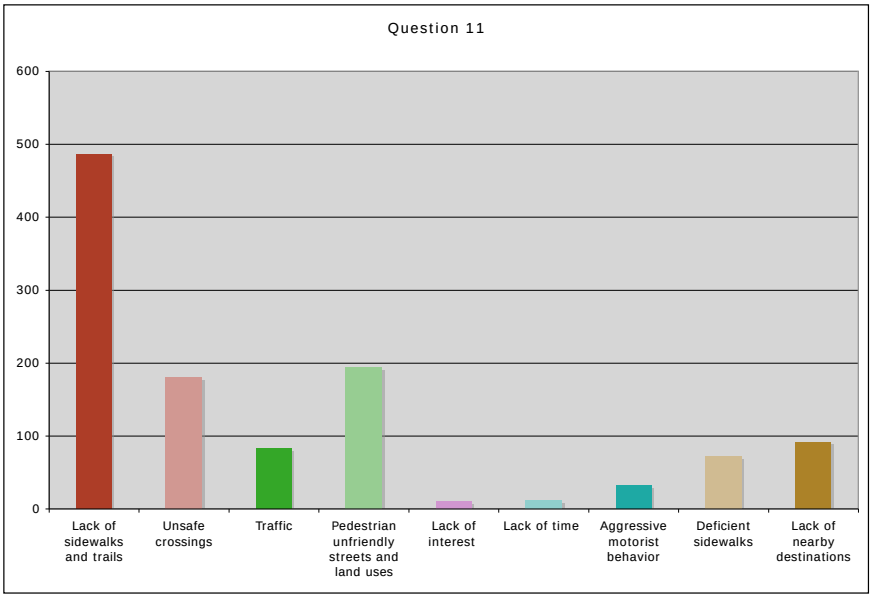
- Place of work
- School
- Restaurants
- Public Transportation
- Shopping
- Parks
- Entertainment
- Trails and greenways
- Libraries or recreation centers



11. What do you think are the biggest factors that discourage walking? (Please choose and rank your top 3 with 1 being the most discouraging)

- Lack of sidewalks and trails
- Unsafe crossings
- Traffic
- Pedestrian unfriendly streets and land uses
- Lack of interest
- Lack of time
- Aggressive motorist behavior
- Deficient sidewalks
- Lack of nearby destinations

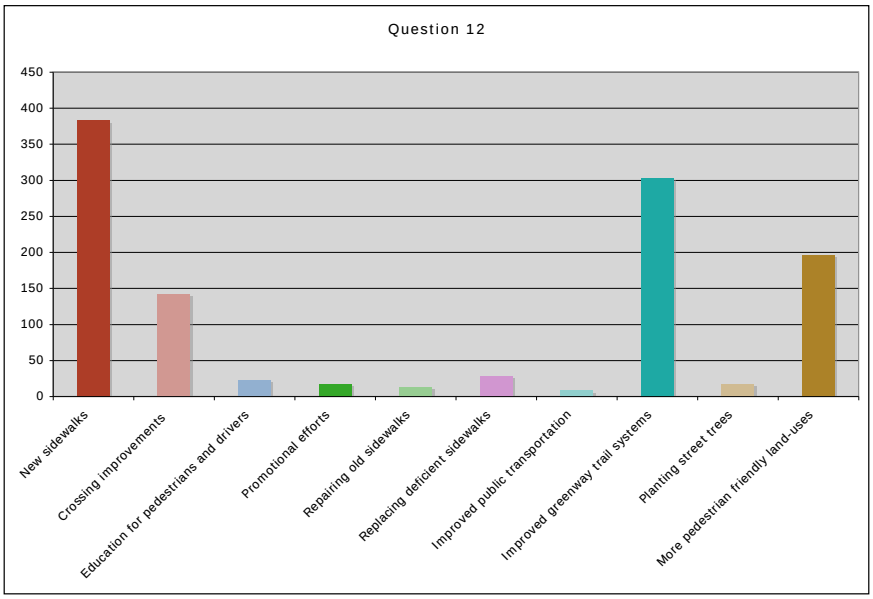
12. What actions do you think are most needed to



increase walking in the community? (Please choose and rank your top 3 with 1 being the most important)

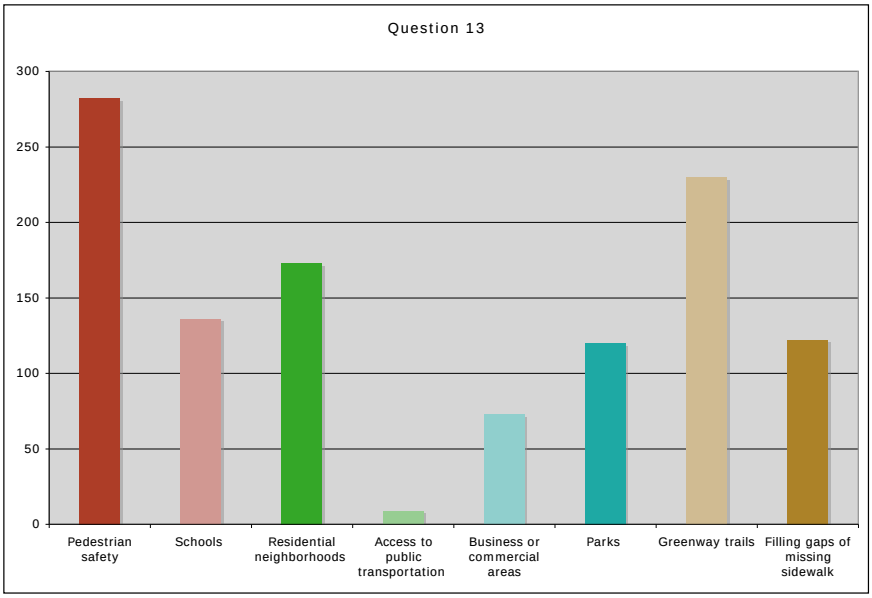
- New sidewalks
- Crossing improvements
- Education for pedestrians and drivers
- Promotional efforts
- Repairing old sidewalks
- Replacing deficient sidewalks
- Improved public transportation
- Improved greenway trail systems
- Planting street trees

– More pedestrian friendly land-uses



13. In thinking about future sidewalk construction which of the following areas should be the most important considerations in determining areas to develop first? (Please choose and rank your top 3 with 1 being the most important)

– Pedestrian safety
– Schools
– Residential neighborhoods
– Access to public transportation
– Business or commercial areas
– Parks
– Greenway trails
– Filling gaps of missing sidewalk



14. What do you think are the top roadway corridors most needing sidewalk or trail improvements?

The following question asked for an open-ended response. 170 respondents answered this question. The results are listed below in order of popularity.

- Holly Springs
- Main Street / Old 55
- Bass Lake Road
- Avent Ferry
- Sunset Lake
- Sections of 55
- Optimist Farm
- Downtown
- Grigsby
- Elm
- Earp
- Raleigh
- Cass Holt
- Stinson
- Kildaire Farm
- New Holly Hill
- Stephenson
- Pierce Olive
- Teal Lake

15. Do you have suggestions about specific programming or pedestrian related policies that you would like to see enacted?

This question required an open-ended response to be typed in by the respondent. 103 people responded to this question. The following results are listed exactly as were typed in by the respondents.

- A bond referendum

- Require builders and developers to pay more toward these items , pay extra towards more walkways and curbing, or allow them to install more then just their projects.

- The community needs to help Devils Ridge Golf Course let kids and adults know the cart path around the course is not a walking, running and biking trail.

- Adjacent subdivisions should be required to connect to each other with roads and sidewalks.

- Funding needs to be given to make this town 'walker friendly' and continue to define us as the finest small town in the world. Water stations along major walkways would be a lovely addition. Crossing Holly Springs road to access schools/pools or restaurants is a scary event. Is there someway to build walker bridges over the roads or tunnels under the roads??? With walking comes greater health benefits...we will also become one of the healthiest places to live. Investments now will pay off in the future. Don't just build sidewalks make the scenery attractive, shady and pedestrian friendly. Good Karma spreads.

- The Wake County School system could save money if there were more sidewalks. I won't let my son ride his bike to HRMS because of the lack of sidewalks and safe crossing. (I live in Windward Pointe.)

- Establish combination biking/walking routes

- More/better publicity about greenways.

- Maps of greenways, trails, pedestrian walkways. Speedbumps before and after Bass Lake to slow traffic and encourage walking. Speedbumps near Lowes Foods Shopping Center for same reasons. New walkways on Holly Springs Road with plenty of green area to provide protection from traffic. New stoplights at Linksland and Holly Springs Road with painted walkway crossing.

- Students are unable to walk from our subdivision (Sunset Oaks) to their schools at Middle Creek Schools (elementary, middle and high) because Optimist Farm Road is COMPLETELY UNSAFE. Students that stay after or miss the bus and are unable to get a ride are forced to walk on a busy, winding street that has NO SIDEWALKS. They walk in waist-high grass because they are afraid of being hit by a car! This is definitely an area that needs improvement! I would also like to be able to walk in the other direction on Optimist Farm Road (toward the Harris Teeter). Thank you.

- I think a Bike lane/Pedestrian lane should be added to the streets. If you look at other communities around the United States such as Orange County, CA. They added an additional 3 to 4 feet to the shoulder of the road allowing pedestrians, joggers, and bicyclist room to safely use the streets also. These lanes are clearly marked so motorist can navigate the streets and so they do not drive into those lanes. Too many times I have had to stop, slow down, or wait to safely navigate around a jogger/bicyclist that is trying to use the same road as me. I think this would promote a much healthier and safer lifestyle for all. Sidewalks are great, but if you are trying to ride a bike to work. The side walk is usually not the place you will be riding. Lets learn from other communities what not to do and what we should be doing!

- Speed control measures and pedestrianisation of Bass Lake road

- Promote bicycle use & safety in addition to pedestrian infrastructure & programming. Create a mixed-use bicycle and pedestrian lane along Bass Lake Road, from Holly Springs Road to Bass Lake Park.

- I would really like to see something done on Optmist Farm Rd. Traffic seems to actually speed up when I am standing there trying to cross the street to get to another neighborhood for walking and recreational use of parks/pools. That road is becoming too busy for pedestrian traffic from schools, neighborhoods to not have it become a priority.

- Some of these roads don't even have safe shoulders, let alone sidewalks. Bass Lake Road is a danger to walkers and cyclists--and even motorists--due to crumbling asphalt on the edges.

- I would like to see a more proactive approach to pedestrian and bicycle use of roadways by sidewalks and/or wide shoulders. The town of Cary does a good job of this and obviously been good for the growth of the community. Having safe pathways between neighborhoods not just within them will promote more of a community feeling.

- Anything that promotes safety for walking and gives citizens more sidewalks with which to get around town (especially from Oak Hall subdivision). Thanks!

- Let look at the way Cary handles this issue. Plenty of walking and biking opportunities

- Please connect the sidewalk from Lowes Foods towards Cary. It would be nice to be able to walk from my neighborhood, Windward Point to downtown via 55 (No sidewalk from Sonic to Walgreens).

- I would like to be able to walk to all major shopping areas, Community Centers & Parks without walking on busy roadways.

- Yes-bicycles and pedestrians should have a side each

- I'd like to see updated sidewalk/greenway plan maps online. The existing map seems to be old.

- I would like to have public transportation in holly springs.

- None

- Developers should be required by the Town to put in greenway trails as they build new residential developments.

- I would like to see roads and sidewalks abutting construction areas kept clean of mud and debris. The areas in Holly Glen are unsightly and difficult to navigate b/c of the huge mud puddles along intersections of Evergreen View.

- No

- I live in Oak Hall and I love how close it is to the center of Holly Springs. However, it has always made me crazy that I can't walk to the post office which is less than a mile from my house because it is unsafe to walk on Main Street because it has no sidewalks. The same applies to not being able to walk to City Hall or other locations in the center of town. I would love to walk to my errands in town and get myself and my children some exercise but at this point it is too dangerous.

- I used to live in cary & could run with sidewalks for 5+ miles on many different routes throughout the town. I'd like to see Holly springs have good lengthy running trails/sidewalks. I'd suggest some cyclist considerations, also (road biking) since there are so many cyclists that ride around Holly Springs & down Avent Ferry Road.

- I would like to see some type of Bike Route lane included on Avent Ferry Rd. It makes it very difficult for Bike Riders/Walkers to travel along that road especially with the recent Construction and two lane road.

- As an occasional cyclist, I'd like to see at least a pedestrian bridge over the creek bed to connect Womble Park to Bass Lake Road until the road construction is completed. As a motorist, I'd like to see sidewalks and street-lamps along Bass Lake Road, Holly Springs Road, Earp Street, and North & South Main Street to give both pedestrians and casual cyclists

a safe place to walk or ride. Perhaps Holly Springs could use the call-boxes that various local universities use for that extra feeling of safety for everyone.

- Not only pedestrian needs, but also needs for bicyclists and mixed use paths and greenways. With such a low population density, bike paths seem more useful for more people. Also, education for bike riders (e.g., bike riders are on vehicles and should ride WITH and not AGAINST traffic).

- It would be great to have a nice downtown with shops and restaurants for people to visit. However, I am hearing from business owners that they are choosing to develop elsewhere due to restrictive ordinances which cause great additional expenditure if they were to choose the downtown area. Town needs to expand roads and sidewalks, not expect individual property owners to do it. Otherwise you will not attract SMALL businesses there... which are the exact ones you need to create a 'real, down-home, downtown environment.'

- Lack of sidewalks are the biggest reason I am unable to park the car more and walk, with the new high school and elementary school going up I think it is imperative to extend sidewalks from Main Street down Avent Ferry at least to the schools, making Holly springs more pedestrian friendly would give alternatives to the more and more congested roadways that are full and going to become more full as neighborhoods are expanded. Widening lanes of various roads can be good but it is like loosening the belt - just gives room for it to fill up without giving alternative means or solving the problem. There are lots of great resources on the web like www.bikefriendlycommunities.org that give great ideas. I look forward to HS adopting and moving forwards with these updates.

- I enjoy running into town, but the new library has put a temporary hold on those efforts. Hopefully there are plans to include access to the new library from Ballentine St. & the Oaks at Avent Acres Subdivision. Also, running down Avent Ferry Rd. to Elm St can be hazardous and a new sidewalk there would be great! Thanks for allowing us to speak out minds!

- Send out flyers to residents instructing them on how to walk down a street (with/without a sidewalk), ride a wheeled (motorized/non-motorized), and sidewalk etiquette regarding two way traffic on one sidewalk. Include a summarized version of the laws regarding pedestrians and the right of ways.

- Programming idea: A run/walk group for socializing and getting fit at the same time. Can be divided into levels (beginner, intermediate, advanced) so that there is something for everyone. Would be a way for people to get to know each other and promote walking.

- We definitely need a crossing guard at Middle Crest if you don't put a sidewalk on the North side of Holly Springs Road - Kids who live in North

can't walk to either school safely. Would also be nice if the sidewalks were a touch large to more easily accommodate children on bicycles so they don't ride in the street to go to school. We have 2 great parks but neither is accessible by bike or ped. Bass Lake Rd. is not safe to walk or ride on at all.

- I would love to see more greenbelts or walkpaths throughout Holly Springs. This could also be sidewalks but nicely esthetically developed paths would work very nicely! We definitely need more now around the newly built schools off Avent Ferry Rd. This could be a great area to put a new park and rec center!!!!

- Include provisions for bike paths and/or pedestrian walkways when designing road or intersection projects.

- The Town desperately needs a green way / trail system & Park, around sunset Lake commons! There are way too many new homes, and no Town Parks or way of getting around. In fact the overall roads @ optomist farm and bible way, and sunset lake are UNSAFE for pedestrians and motorists. Too much traffic, not enough traffic control. Worry about that first...then worry about policies.

- I would like to see more parks for the kids, community paths in residential neighborhoods with proper lighting at night for safety.

- Driving on Sunset Lake Road (left turn from Holly Springs road heading toward Cary) is dangerous for pedestrians and driver. People often walk in this area and due to lack of street lighting and sidewalks, these people are invisible to drivers at night. This area is an accident waiting to happen. Also the schools should be connected to the shopping centers via sidewalks since many children use go to the shopping centers from the schools. This should be a top priority. Why the sidewalk from Holly Ridge Elementary to Lowe's was not completely paved is beyond me. Also - there is a great need for signs similar to those on Main Street in Fuquay Varina informing drivers that NC law requires cars to stop at crosswalks. While running, I have never had a vehicle to stop for me while using the crosswalk on Holly Springs Road near the MS.
Cars do not appear to give children at these crosswalks the right-of-way either. Drivers seem unaware that pedestrians should have the right-of-way.

- I would like to see separate walkways for dog walkers. I would like to walk with out having dogs approach me and without having to view their bathroom habits.

- Make greenways wide enough for both pedestrians and bicycles Start with plan and then fund the highest priority walkways in each part of the City

- As our town prospers and, I assume, a more robust center of town ensues,

I think there is an advantage to having safe walking access to the center of town from the residential neighborhoods.

- I would love a greenway system through Holly Springs that is easily accessible.

- Shady greenways connecting the area neighborhoods with the downtown area (new library, etc.) and our many parks would be a great boon to the community. And a sidewalk system on Bass Lake would go a long way towards helping with pedestrian safety, as there are many pedestrians who currently walk along that road - a very dangerous situation.

- Having crossings on streets for pedestrians, teaching motorists to give way to pedestrians, providing several watering spots on the walking routes.

- I think that builders of new neighborhoods or developers in new sections of neighborhoods should have to install sidewalks and greenways that connect with others. I realize that this may increase the house prices but they are already increasing and the builders are already required to set aside open space or pay money instead. I also think that old and new businesses should be required to install bicycle racks.

- Sponsor community walks or volksmarches. Publish maps of existing and planned trails and greenways. Parks and rec incentive plan for walking x,000 miles per year, etc..

- I would like to see an annual 'Walk Holly Springs' event. I think the family friendly aspect of our community would be enhanced if strollers and dogs could walk safely.

- Pedestrian friendly streets to include crosswalks and signage informing automobiles to stop for pedestrians. I really find that those pedestrians that need to use New Hill Rd. in between the Bypass and Holly Springs Rd are in danger. There aren't any sidewalks, and the road is narrow. I have heard multiple people admit that they almost accidentally hit someone because someone was walking on or toward the middle of the street. Unfortunately, sometimes these people are too dark to see clearly at night and do not always wear reflectors. There needs to be a sidewalk there. All residents deserve to be safe in their neighborhoods, and living so close to town they deserve safe access to what the town has to offer.

- I would like to see more fund raising events such as March of Dimes, Walk for the Cure, etc. using our pedestrian corridors. Pre-event briefings to participants should include mention of pedestrian safety, health benefits of walking, and route utility training. Route utility training explains how people can get to the places they want to go in a safe and healthy way, and encourages the use of our pedestrian corridors everyday. Aside from raising money for the charity, I believe this would be a good way to generate interest in using our pedestrian corridors and educating the people who would be most likely to use them.

- I really wish so much there could be a wooded trail where dogs could run off leash, it would be very popular I think I like to walk in the woods behind my subdivision at Trotter Bluffs but it is so muddy and tick infested during the summer I can't, so I go to Harris Lake with my dog and let him off leash deep in the woods but it's not allowed, I just wish there was someplace I could go to let my dog run free in the woods which he loves to do, and if there was some sort of water he could jump into to cool off it would be a dream come true for both of us

- Bass Lake Road is too narrow for me to walk with my child's stroller....we get honked at as we walk on that street--sidewalks would be a HUGE help!!!! THANKS! We walk from Remington (Holly Mountain Road) to the shopping center with Lowe's Foods.

- We also need bike paths on the roadways in addition to bike racks at our shopping areas and the new library and the schools. More people would shop by bike that walk because of time issues. Pedestrian and bike traffic go hand in hand.

- No bicycling or dog walking on the same sidewalk or trail.

- Simply to just connect the existing sidewalks so that we can walk to the different shopping centers and to the post office to start with.

- I would absolutely love to see some kind of water/fountain/playground feature and maybe even some kind of botanical garden that would be worth the trip to Holly Springs from other communities. Atlanta had several of these and they were great for kids as well as adults. One was near/in a shopping center. Maybe one of the new shopping center developers could even pitch in.

- I think when considering a pedestrian friendly community is important to consider ways to make the community bike friendly as well. Making roadways safe for pedestrians and cyclists alike will promote a healthier, happier and more closely knit community. We love to support our local shops and restaurants and having easier ways to access these as well as bringing in new options for residents should be a top priority.

- Just please put in greenways or side walks connecting neighborhoods so you don't have to walk/run on the narrow country roads. We are new to the area from Denver and the neighborhoods along the Optimist Farm Road corridor seem very isolated because none are connected and you are forced to drive everywhere. Cary is on the right track, but research how Denver / Boulder, CO does it. They have it down to a science. Thanks

- Sunset Lake Road really needs side walks. People have to walk in the streets just to get to destinations around the area. It is unsafe with the heavy traffic on the street. Once the trailer park is sold, it will be nice to have a side walk extend from the corner of Stephenson Road all the

way down to Holly Springs intersection. Several subdivisions are coming underway along Sunset Lake Road. We could really use the side walks to integrate the whole community!!

- Guess? SOMERSET FARM! We are a neighborhood of over 200 homes - with currently NO safe pedestrian exit. There are at least two sites where a greenway could be connected to our neighborhood - either at the end of Teal Lake, or the end of Damask Rose. PLEASE, please provide either access to the public greenway, or safe sidewalks! (They took out the partial sidewalk on 55!)

- Make the new builders include greenways and sidewalks as part of the approval process.

- I would like to see a greenway that would connect Somerset Farm subdivision to existing parks, new parks and other neighborhoods and destinations

- Somerset Farm Subdivsion needs access to town, to parks, etc. that does not include Hwy 55. It is unsafe & we have no other access at this time. Our neighborhood is full of families with children who would LOVE to be able to walk safely to Womble Park, Hunt Community Center, the new library and cultural center. Please help us do this safely & enable us to better enjoy all the opportunities that the TOHS provides for its residents. Thank you.

- The people in Somerset Farms have no safe place to walk into town. What little bit of sidewalk we had on 55 was taken out and never replaced at the time of the 55 widening.

- As a resident of Somerset Farm, I'd personally like to see any access to the downtown area/new school area where both of my children attend HGES and HSHS/Womble park area all be included in any upcoming plans. We feel as a community that we have continued to be pushed further and further out of the 'town' limits. We currently have NO access to town and therefore our only means of access is to drive. The town is missing a great source of income as once we are in our cars, our options of where we choose to spend our money becomes unlimited. If we had access by foot or by biking, we'd be more inclined to spend money within the town. Much thanks, Meredith Barefoot Concerned Resident

- We in Sommerset Farms Subdivision have no access to the town without having to walk down the busy and sometimes dangerous highway 55 we hope that one day we will have a walking access to town or to the parks in town

- Greenways should connect to all subdivisions and residential neighborhoods. Connecting to downtown HS, Womble Park, schools, and Bass Lake for starters. Should be safe for biking and walking.

- There is currently no pedestrian access from Somerset Farm Subdivision into the Town of Holly Springs at all. There should be something... anything at all. Also, I am not aware that there is any public transportation in or around Holly Springs. Again, there should be something.

- I would like to see ALL neighborhoods have at least one way to safely access various parts Holly Springs without using a car

- I currently live in Somerset Farm and cannot safely walk to any part of Holly Springs. My neighborhood is close to many parts of town (ie. Downtown, new development that will be coming along the bypass) but I cannot safely access these areas without driving.

- Somerset Farm is very isolated unless you walk along the highway, I'd drive more (less traffic/pollution) and walk much more IF I had a safe walkway giving me access to Parrish Womble Park, Bass Lake Shopping Center and Downtown Holly Springs.

- I would like for you not to forget about the 200 Plus families that live in Somerset Farm. We have been alienated from the rest of the town. With Walmart coming across the street from us, it would be nice to at least be able to walk there and experience a positive side of the urban development. In addition, it would be wonderful to be able to walk to Womble park and see the fireworks or simply take in a baseball game, or fly a kite without having to drive there. Further development is about to happen at the back of our neighborhood, and there will be future families to benefit, please allow us that live in this part of holly springs access to the rest of the town by foot or bike. The land is there, the links are available, please make the right decision and connect us. All we have is highway on one side, please let us have another WALK-ABLE out from the back side to this wonderful town.

- I would LOVE to see a greenway or access to/from Somerset Farm. I refuse to walk on Hwy 55 to get to downtown or Womble Park, so sometimes if I have to drive I end up going to Fuquay.

- No

- Required pedestrian crossings at new shopping areas-paid for by the developers!

- I live in Somerset Farm and would like to be able to connect to shopping, downtown, and parks without having to come out onto Main Street. I'd also like to see the town's police force crack down on speeding and reckless driving. I try to always go the speed limit, and I've had people tailgate me and pass me (even when it's illegal) for it, even in school zones. There is no excuse for it.

- I would like to see pedestrian friendly access to downtown and shopping areas

- Greenways from neighborhoods to parks/recreation areas like Womble Park.

- Development should ALWAYS consider the pedestrian when planning. Traffic cannot be helped, but think of Greenways, Parks, and other avenues outside from and away from traffic corridors. Make alternative routes for pedestrian travel to other areas. Don't make the same mistakes as other communities. We are early along in the planning stage. Don't mess it up!

- I love to walk but find it unsafe crossing hwy 55 from Somerset Farms to Ralph Stevens road (only area conducive to exercising) especially after the widening of 55. I am willing to help or help fund a connection from our residential area to the town and parks and greenways.

- Connect neighborhoods with downtown

- Somerset Farm area needs access to greenways being planned.

- I live in Somerset Farm Drive and have lived here for 6 years - I am excited about the growth in the area but am disappointed since they put Highway 55 expansion they removed our sidewalks near the highway
- Fuquay has sidewalks from downtown all the way down 55 to the city limits so I know it was not a safety issue. I would love to walk somewhere other than around the neighborhood- would love to walk to Womble Park. When we run we have to run on the roads which is not wide enough for cars and pedestrians.

- PLEASE give us a way to get out of our subdivision besides driving! Would love to stay in HS but if we do not develop the areas properly it will cause people to move elsewhere.

- I would like any greenways or trails to be marked with mileage signs, or have the information available on the web. I'd really love trails from the back of Somerset Farm subdivision to both Womble Park and Bass Lake Park. I'm certain they would get lots of use.

- I'd like to be sure the Somerset Farms subdivision isn't left out of any plans that are taking place.

- It would be good to have pedestrian friendly access from Route 55 (Somerset Farms) to downtown Holly Springs.

- None.. Let's put the money in something other than Greenways which over time become less and less used but still have to be maintained.

- Please do something to connect somerset farms to downtown Holly Springs. I would never dare walk or ride bikes into town with my children now but would LOVE to. I hope this greenway system doesn't ONLY cater

to the richest areas of Holly Springs (Sunset Ridge). They get everything else!

- We would like to see a greenway system throughout the town of Holly Springs and more pedestrian friendly roadways (Main Street).

- Greenway/trail or sidewalks from Somerset Farm towards Holly Springs to Womble Park.

- I would like to see Somerset Farm subdivision have more pedestrian access to downtown Holly Springs, Womble Park, and the future WalMart shopping center across from our subdivision. There used to be a sidewalk in front of our subdivision so you could walk to the other side while next to hwy 55, but after widening the road it was taken up. We have no pedestrian friendly access to anywhere but within our neighborhood. It would be nice to conserve fuel by having places to walk to. Also, I think there should be more greenways in Holly Springs that link up to Bass Lake, which would make it a more visited place by Holly Springs residents!

- I would like to see sidewalks downtown and in Somerset Farm, so that we may walk to the new library and shopping areas.

- Safe access to sidewalks or greenways

- Is anyone going to the schools to teach the kids what way to face the traffic when walking or riding a bike?

- Just make it a priority. Educate people. It would open up all Holly springs' little bubble neighborhoods...

- Our Mayor still refers to this community as a town, a place that is unique. If you don't enable the people of a town to walk to get places, we are going to end up being another sprawl that isolates people. We need to be able to bring people together without having to worry about huge parking areas. Connecting the PEOPLE to the businesses/libraries/restaurants/parks with sidewalks will enable us to keep the 'town' identity and a Unique and special place to live.

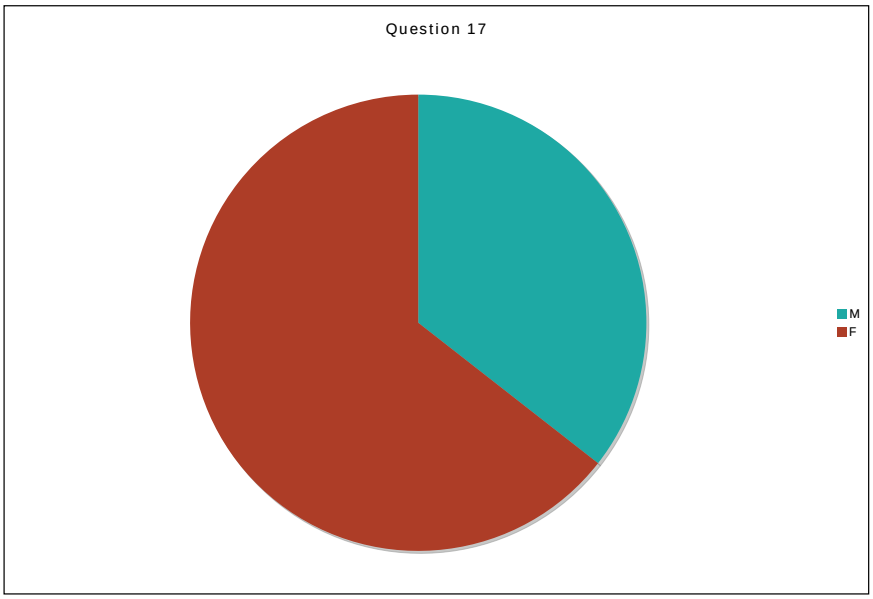
- I would like to see trails (walk and bike) from the Somerset Farms subdivision to downtown Holly Springs.

- Walkways connecting neighborhoods to shopping, restaurants and parks. Nature trails.

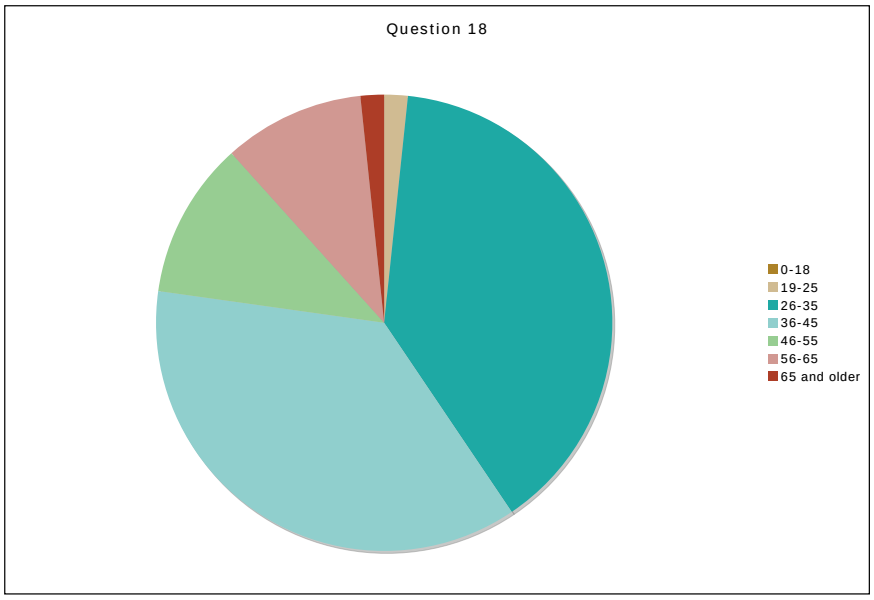
16. What is your zip code?

186 people responded to this question. 183 people were from Holly Springs, 1 person was from Raleigh, and 2 people were from Apex. 17 people did not answer this question,

17. What is your gender?



18. What is your age?

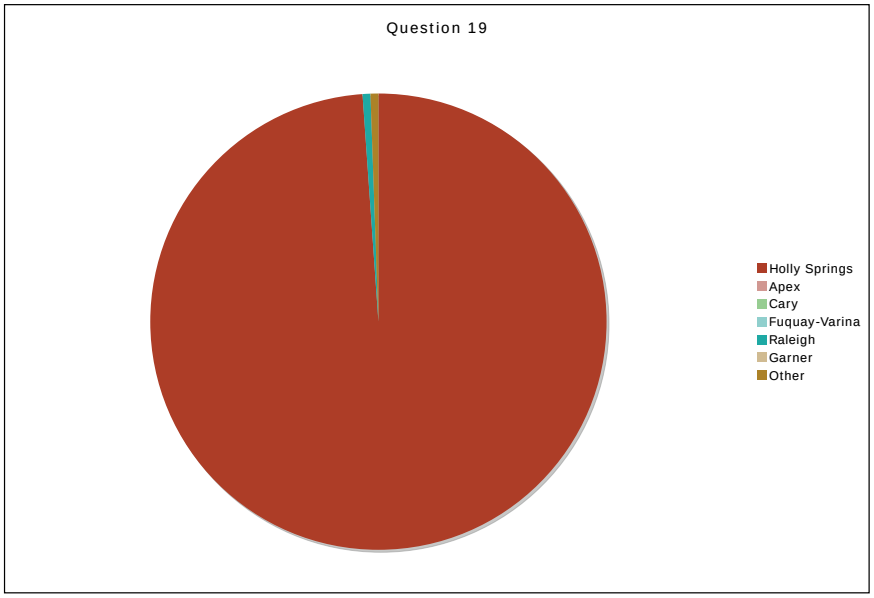


19. Where do you live?

This question required respondents to list their town of residence. 189 people responded to this question. 187 people were from Holly Springs, 1 person was from Raleigh, and 1 person listed "other".

20. Please provide your email address below if you would like to stay up to date with the Holly Springs Pedestrian Transportation Plan.

This question required an open-ended response from each person, prompting for a complete email address. 134 people answered this question. 69 people did not supply an email address.



A.3 General Comments

During the planning process, numerous emails were sent to the Town of Holly Springs, discussing specific issues or concerns from area residents. The following list summarizes the content of those emails.

Maintenance Issues

- Clay run-off causes sloppy and slippery sidewalks

Requested Improvements

- Bass Lake Road (mixed use bicycle and pedestrian- instead of just sidewalk) a High Priority Segment
- Sidewalk along Avent Ferry Road (Bypass to Town) x 2
- Sidewalks along Sunset Lake Road (Sunset Lake to Harris teeter Shopping Center) x 2
- Fill sidewalk gaps (Oak Hall to Walgreens)
- Fill sidewalk gaps (West Lake to Harris Teeter)
- Crossing (grade change if possible) Holly Springs Road
- Sidewalk/Fill Gaps along Grimsby (inside curve at Womble Park across from Parkside Village – sidewalk stub at Lakeside to Greenway stub in Womble Park) X 4
- Sidewalk along Grimsby (Stinton to Raleigh Street) x 2
- Sidewalk along Main to town
- Sidewalk or paved improvement along Holly Springs Road (Spring Meadow subdivision to Bass Lake Shopping Center)
- Sidewalks along Optimist Farm Road (Sunset Lake Road to City boundary, Sunset Oaks Subdivision)
- Safer Bus Stop along Optimist Farm Road
- Lighting at intersection of Firefly and Sunset Lake Road
- Sidewalk and /or bike lanes along Bass Lake Road/or alternative off-road (Shopping Center to Bass Lake)

General Comments or Suggestions

- Slow down traffic coming into town
- Parking on sidewalks, sections that cross driveways?
- Expand Audience to include…
  - -Kids on bikes
  - -Skateboarders
  - -Rollerbladers

Appendix B
Prioritization Matrix

B.0 Overview

The proposed pedestrian network for the Town of Holly Springs will likely be developed incrementally due to budget constraints and steady growth. Projects were prioritized by the criteria listed below to generate a list of top priority projects. Variations of this prioritization method are used in award-winning pedestrian plans across the United States. Road Segments were broken into logical geographic segments when a specific road segment extended across a significant distance, such as Main Street, Holly Springs Road and Avent Ferry Road. The 'Pedestrian Potential' criteria list below was customized and weighted according to input from the Holly Springs Pedestrian Advisory Committee, public workshops, public comment forms, and the online survey (See Chart B.1 for a list of how each recommended route segment scored):

- Direct Access to a School
- Elementary School Proximity: Based on a1/2 mile radius
- Middle School Proximity: Based on a 1/2 mile radius
- High School Proximity: Based on a 1/2 mile radius
- Parks, Recreation Centers, and Playgrounds: Based on a 1/2 mile radius
- Direct Access to/from an Existing Greenway
- Direct Access to/from a Proposed Greenway
- Direct Access to/from Higher Density Residential Areas: Based on 4.50 Units/AC or above
- Direct Access to/from Future Development: Based on High School Development Activity Map
- Connections to the Downtown District or Central Business Zoning: Based on the Village District boundary
- Direct Access to Commercially Zoned Areas: Refers to General Business Zoning or Neighborhood Business Zoning
- Regional & Citywide Connections: Refers to connections in and out of the Holly Springs ETJ and connections across NC 55 Bypass and the future 540
- Connectivity to Existing Sidewalks - Based on sidewalk GIS layers developed by the Town of Holly Springs

Three phases for facility implementation are proposed as follows: the short term phase is 0-5 years; medium term phase is 5-10 years; long term phase is 10-20 years. A list of top priority action items has been pulled out of the first phase segments. Development efforts should occur within 0-3 years for these top priority, early action items. These projects are specific improvements that will facilitate an immediate increase in connectivity, access, safety, and promotion of the network. The ranking of pedestrian facilities simply shows the ideal order based on a measure of many factors and if an opportunity arises for implementation of a lower ranking facility through development or roadway improvement, that facility should be implemented regardless of its ranking in the priority matrix.

B.1 Top Priority Sidewalk Projects

The top priority projects are those that ranked highest in the prioritization matrix (Table B.1) and/or presented unique opportunities to have an immediate impact. These are listed below:

- Holly Springs Road from Main Street to Bass Lake Road
- Avent Ferry Road from Cass Holt Road to NC 55 Bypass
- Holly Springs Road from Bass Lake Road to Linksland Drive
- Main Street From Springstone Drive to Holly Springs Road
- Avent Ferry Road from Longbottom Road to Cass Holt Road
- Avent Ferry Road from NC 55 Bypass to Earp Road
- Holly Springs Road from NC 55 Bypass to Main Street

B.2 Intersection Improvement Projects

Intersection improvement projects were divided into three phases based on public input, consultant field work and intersection relationship to prioritized road segment. Projects are listed below:

Short Term

- Main Street and Holly Springs Road
- Main Street and Oakhall /Cayman
- Holly Springs Road and Cayman
- Holly Springs Road and Bass Road
- Holly Springs Road and Cobblepoint Way
- Holly Springs Road and Middlecrest Way
- Bass Lake Road and Brook Manor
- Bass Lake Road and Salem Ridge Road/Bass Lake Park

Medium Term

- Main Street and Oakhall/Springstone
- Holly Springs Road and Linksland Drive
- Avent Ferry Road and NC 55 Bypass
- Avent Ferry Road and Cass Holt Road

Long Term

- Ballentine Street and NC 55 Bypass Road
- South Main Street and NC 55 Bypass
- South Main Street and Ralph Stephens Road/Teal Lake Drive
- Holly Springs Road and Sunset Lake Road
- Sunset Lake Road and Wescott Ridge Drive
- Optimist Farm Road and Roseberry Way

Map B.1 illustrates prioritized sidewalk and intersection improvement projects.

B.3 Greenway Projects

Greenway projects in Holly Springs were prioritized largely based on opportunity, future need, public input, previous planning efforts and goals of the Parks and Recreation Department. The greenway corridors listed below are the top priority projects for the Town of Holly Springs:

- All greenways proposed in the Village District Area Plan
- Greenway linking Womble Park to the Village District Area
- Greenway linking Womble Park to Bass Lake Park
- Bass Lake Greenway Loop completion

- Middle Creek Greenway from Sunset Lake to Main Street
- Spurs from Middle Creek Greenway to central portions of Holly Springs
- Greenway along North Main Street along abandoned rail line
- Utley Creek Greenway linking Holly Glen to the Village District Area
- Greenway spur from Utley Creek Greenway to Holly Springs Business Park

Map B.2 illustrates top priority greenway projects.

Appendix C
Cost Estimates

C.0 Sidewalk Cost Considerations[1]

The actual cost of providing sidewalks is different for each region of the country and varies with the season. Actual bid prices are also influenced by how busy contractors are at the time of construction. The cost of constructing sidewalks alone is about $8-$9 per square foot including such things as curb ramps and crosswalk features.

Factors to consider when calculating the cost of sidewalks

1. *Presence of curb and gutter*

The costs of providing curb and gutter, which presumes the need to also provide a street drainage system, run much higher than the cost of sidewalk alone.

2. *Number of driveways*

To comply with ADA, many existing driveways must be replaced with ones that provide a level passage at least 0.9 (3 ft) wide. It can also be advantageous to inventory all existing driveways to see if any can be closed, resulting in a cost-savings.

3. *Number of intersections*

While intersections represent a reduction in the sidewalk, curb ramps are required where sidewalks cross intersections and the cost of providing additional traffic control at each intersection should be considered.

4. *Obstacles to be removed*

The cost for moving or removing obstacles such as utility poles, signposts, and fire hydrants vary too much to be itemized here; however, they are required to be moved if they obstruct access. These costs must be calculated individually for each project.

5. *Structures*

While minor sidewalk projects rarely involve new structures such as a bridge, many projects with significant cuts and fills may require retaining walls and/or culvert extensions. The costs of retaining walls must be calculated individually for each project.

6. Right-of-way

While most sidewalk projects can be built within existing rights-of-way (especially infill projects), some may require some right-of-way easement. An alternative to acquiring right-of-way is to narrow the roadway, which should consider the needs of bicyclists (e.g., through bike lanes or shoulders, at a minimum of 1.5 m (5 ft).

7. Miscellaneous factors

Planters, irrigation, benches, decorative lampposts, and other aesthetic improvements cost money, but they are usually well worth it if the impetus for the project is to create a more pleasant and inviting walking environment.

When project costs appear to be escalating due to one or more of the above-listed items, especially retaining walls or acquiring right-of-way, consideration may be given to narrowing the sidewalk in constrained areas as a last resort. The full sidewalk width should be resumed in non-constrained areas—this is preferable to providing a narrow sidewalk throughout, or dropping the project because of one difficult section.

Tips to Reduce Total Costs

1. Stand-alone vs. integrated within another project

Sidewalks should always be included in road construction projects. Stand-alone sidewalk projects cost more than the same work performed as part of a larger project. Sidewalks can be piggybacked to projects such as surface preservation, water or sewer lines, or placing utilities underground. Besides the monetary savings, the political fallout is reduced, since the public doesn't perceive an agency as being inefficient (it is very noticeable if an agency works on a road, then comes back to do more work later). The reduced impacts on traffic are a bonus to integration.

2. Combining Projects

A cost-savings can be achieved by combining several small sidewalk projects into one big one. This can occur even if the sidewalks are under different jurisdictions, or even in different localities, if they are close to each other. The basic principle is that bid prices drop as quantities increase.

C.1 Cost Estimates

The following table uses an estimate of $3/square foot to provide an estimate per each pedestrian corridor. $3/square foot was chosen to be conservative and is towards the high end of typical costs per square foot. Some pedestrian corridors have sections of existing sidewalk so these sections were subtracted from the overall construction length. Holly Springs currently only issues incentives to construct sidewalks on both sides of thoroughfares, collectors, and commercial streets. However it is recommended in this Plan to require sidewalks on both sides of all thoroughfares, collector, sub-collector, and local streets (except for short cul-de-sacs, dead-end streets and roadways in areas of rural development. Otherwise, residential streets only require one side. This was taken into consideration when developing these cost estimates.

Estimated costs were also calculated for the top priority greenway projects in the Holly Springs area and can be found in Table C.2. The number of $350,000 per mile of trail assumes a 10-foot wide asphalt surface, with signage, trailheads, and minor bridges. This cost is significantly reduced for natural surface types which will be options for these facilities. These estimates are based on a number of local studies and local research.

As mentioned above, other factors can increase actual costs. These estimates are simply to serve as a rough guide for the Town of Holly Springs.

Footnotes:

[1] "Recommended Guidelines/Priorities for Sidewalks and Walkways." http://www.walkinginfo.org/pedsafe/moreinfo_sidewalks.cfm#cost. US Department of Transportation, Federal Highway Administration.

The material in section C.1, along with the sidewalk cost estimates per square foot, were taken directly from "Recommended Guidelines/ Priorities for Sidewalks and Walkways," from PEDSAFE online resource, a project sponsored by the USDOT Federal Highway Administration.

Appendix D
Funding

D.0 Overview

Implementing the recommendations of this plan will require a combination of funding sources that include local, state, federal, and private money. This Appendix provides a listing of the most commonly used funds for pedestrian and greenway facility projects in North Carolina. Fortunately, the benefits of protected greenways are many and varied. This allows programs in Holly Springs to access money earmarked for a variety of purposes including water quality, hazard mitigation, recreation, air quality, alternate transportation, wildlife protection, community health, and economic development. Competition is almost always stiff for state and federal funds. It becomes imperative that local governments work together to create multi-jurisdictional partnerships and to develop their own local sources of funding. These sources can then be used to leverage outside assistance. The long term success of this plan will almost certainly depend on the dedication of a local revenue stream for pedestrian and greenway projects.

It is important that Holly Springs fully evaluate its available options and develop a funding strategy that can meet community needs, maximize local resources, and leverage outside funding. Financing will be needed to administer the continued planning and implementation process, acquire parcels or easements, and manage and maintain facilities.

Greenways Incorporated advises the Town of Holly Springs to pursue a variety of funding options. This appendix identifies a list of some of the pedestrian and greenway funding opportunities that have typically been pursued by other communities. Creative planning and consistent monitoring of funding options will likely turn up new opportunities not listed here.

D.1 Federal Government Funding Sources

Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003 (SAFETEA-LU)

While generally a transportation-based program, the Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003 (SAFETEA) funds programs to protect the environment. Through increased funding to the Surface Transportation Program (STP) and the National Highway System (NHS), SAFETEA allows for more environmental projects. States may spend up to 20 percent of their STP dollars (used for transportation facility reconstruction, rehabilitation, resurfacing, or restoration projects) for environmental restoration and pollution abatement projects. Additionally, each state sets aside 10 percent of STP funds for transportation enhancement projects, which can include acquisition of conservation and scenic easements, wetland mitigation, and pollution abatement, as well as scenic beautification, pedestrian and bicycle trails, archaeological planning, and historic preservation. Some of the most pertinent programs under this act are:

Surface Transportation Program (STP)

This is the largest single program within the legislation from a funding point of view, with $32.5 billion committed over the next five years. Of particular interest to greenway enthusiasts, 10 percent of the funding within this program is set aside for Transportation Enhancements (TE) activities. Historically, a little more than half of the TE funds have been used nationally to support bicycle/pedestrian/trail projects. So nationally, it is projected that $1.625 billion will be spent on these projects under SAFETEA-LU.

These funds may be used for construction or non-construction projects that benefit bicycles and pedestrians. "Non-construction" projects are items such as maps, brochures, and public service announcements. These funds may be programmed to bring sidewalks and intersections into compliance with ADA regulations.

Congestion Mitigation and Air Quality (CMAQ)

Under SAFETEA-LU, approximately $8.6 billion has been set aside. Historically, about five percent of these funds have

been used to support bicycle/pedestrian/trail projects. This would equal about $430 million under SAFETEA-LU. CMAQ Improvement Program funds are similar to STP funds in that they may be used for construction or non-construction projects that benefit bicyclists and pedestrians. These funds have been used for bicycle and pedestrian related projects in many states. An additional potential source of funds relating to outreach and public education is the EPA's Mobile Source Outreach Assistance Competition. This funding source focuses on outreach and public education relating to cleaner air and alternative transportation. These grants have a $100,000 maximum with a 40% required local match.

Recreational Trails Program

Originally titled the Symms National Recreational Trails Fund Act, this funding source assists with the development of non-motorized and motorized trails. States receive the funds and can then grant them to other private or public organizations. Under this program, grant recipients must provide a 20 percent match and the projects must be consistent with the Statewide Comprehensive Outdoor Recreation Plan (SCORP) - updated every 5 years by the NC Division of State Parks.

Highway Safety Improvement Program (HSIP)

SAFETEA-LU funds this program at $5 billion over four years. Historically, bicycle and pedestrian projects have accounted for one percent of this program, or about $50 million under SAFETEA-LU. Some of the eligible uses of these funds would include traffic calming, bicycle and pedestrian safety improvements, and installation of crossing signs. This is not a huge source of funding, but one that could be used to fund elements of a project.

Safe Routes to School Program (SR2S)

A new program under SAFETEA-LU is the Safe Routes to School (SR2S) program, with $612 million in funding during the term of the legislation. This is an excellent new program, that within North Carolina will be paired with a variety of health and wellness programs, to increase funding for access to the outdoors for children. Each state will receive no less than $1 million in funding, with 10% to 30% of the funds allocated to non-infrastructure activities. The SR2S Program was established in August 2005 as part of the most recent federal transportation

re-authorization legislation--SAFETEA-LU. This law provides multi-year funding for the surface transportation programs that guide spending of federal gas tax revenue. Section 1404 of this legislation provides funding (for the first time) for State Departments of Transportation to create and administer SR2S programs which allow communities to compete for funding for local SR2S projects. The administration of section 1404 has been assigned to FHWA's Office of Safety, which is working in collaboration with FHWA's Offices of Planning and Environment (Bicycle and Pedestrian Program) and the National Highway Traffic Safety Administration (NHTSA) to establish and guide the program.

High Priority Projects

Under SAFETEA-LU more than 5,091 transportation projects were earmarked by Congress for development, with a total value in excess of $3 billion. An example is the Charlotte metropolitan area with one project receiving funding under the HPP label, the Little Sugar Creek Greenway, which is funded at $3.15 million.

Land and Water Conservation Fund (LWCF)

The Land and Water Conservation Fund is the largest source of federal money for park, wildlife, and open space land acquisition. This federal funding source was established in 1965 to provide "close-to-home" park and recreation opportunities to residents throughout the United States. The program's funding comes primarily from offshore oil and gas drilling receipts, with an authorized expenditure of $900 million each year. However, Congress generally appropriates only a fraction of this amount. LWCF grants can be used by communities to build a variety of park and recreation facilities, including trails and greenways. Fifty percent of the local project costs must be met through in-kind services or cash provided by the recipient. The allotted money varies yearly and unfortunately, the fund has been "zeroed" out for 2006.

Wetlands Reserve Program

This federal funding source is a voluntary program offering technical and financial assistance to landowners who want to restore and protect wetland areas for water quality and wildlife habitat. The US Department of Agriculture's Natural Resource Conservation Service (USDA-NRCS) administers the program

and provides direct payments to private landowners who agree to place sensitive wetlands under permanent easements. This program can be used to fund the protection of open space and greenways within riparian corridors. For more information on all SAFETEA-LU programs, visit http://www.fhwa.dot.gov/safetealu/.

National Highway System Funds

These funds can be used for pedestrian and bicycle projects adjacent to any highway on the National Highway System, including Interstate Highways.

Transportation Enhancement Activities (TEAs)

10 percent of STP funds are earmarked for Transportation Enhancement Activities (TEAs). The list of activities that are eligible under the TEA program, include the following:

- Pedestrian and bicycle facilities
- Pedestrian and bicycle safety and education activities
- Acquisition of scenic easements and historic easements and sites
- Scenic or historic highway programs including tourist and welcome centers
- Landscaping and scenic beautification
- Historic preservation
- Rehabilitation and operation of historic transportation buildings, structures or facilities
- Preservation of abandoned railway corridors
- Control and removal of outdoor advertising
- Archaeological planning and research
- Mitigation of highway runoff and provision of wildlife under crossings
- Establishment of transportation museums

Hazard Elimination and Railway-Highway Crossing Programs

These funds account for 10 percent of a state's STP funds. These funds should be used to inventory and/or address safety concerns of motorists, pedestrians, and bicyclists.

Federal Lands Highway Program Funds

These fund bicycle and pedestrian facilities as a provision of roads,

highways, and parkways. This program is under the discretion of the appropriate Federal Land Agency or Tribal government.

Job Access and Reverse Commute Grants

These can fund pedestrian and bicycle-related services intended to transport welfare recipients and eligible low-income individuals to and from employment.

State and Community Highway Safety Grants

These are part of the Section 402 formula grants for which each state is eligible. States must submit a Performance Plan that establishes goals and performance measures for improving highway safety, including improved bicycle and pedestrian safety.

Environmental Protection Agency

Funding for pedestrian facilities have been available through the EPA's Office of Transportation and Air Quality (OTAQ). One such grant source under OTAQ is "Clean Air Transportation Communities: Innovative Projects to Improve Air Quality and Reduce Greenhouse Gases." These funds assist in the funding of innovative pilot projects to reduce transportation related emissions of criteria pollutants and greenhouse gases by decreasing vehicle miles traveled and increasing use of cleaner technologies. Eligible recipients are state, local, multi-state, and tribal agencies involved with transportation/air quality and/or climate change issues. The use of federal air quality monies was utilized in Billings, Montana for implementation of bike trails using the idea of increased number of bicycles as non-polluting vehicles as justification for obtaining air quality grants.

The Community Development Block Grant (HUD-CDBG)

The U.S. Department of Housing and Urban Development (HUD) offers financial grants to communities for neighborhood revitalization, economic development, and improvements to community facilities and services, especially in low and moderate-income areas. Several communities have used HUD funds to develop greenways, including the Boulding Branch Greenway in High Point, North Carolina. Grants from this program range from $50,000 to $200,000 and are either made to municipalities or non-profits. There is no formal application process.

Rivers Trails and Conservation Assistance Program (RTCA)

This is a National Park Service program. Although the program does not provide funding for projects, it does provide valuable on-the-ground technical assistance, from strategic consultation and partnership development to serving as liaison with other government agencies. Communities must apply for assistance.

The National Endowment of the Arts

Many organizations seek ways to incorporate more of their community into their pedestrian, and greenway planning. One way to do this is to celebrate the cultural and historic uniqueness of communities. There are many funding opportunities for these types of projects. The National Endowment of the Arts funds arts-related programs through the Design Arts Program Assistance, and provides many links to other federal departments and agencies that offer funding opportunities for arts and cultural programs.

D.2 State Funding Sources

Current public sidewalk construction is financed in a range of ways. Town projects have been funded using a mix of transportation bond funds (primarily for sidewalks that have been provided as a part of larger roadway projects) and the use of Powell Bill reserves. The sidewalk portion of state roadway projects is typically funded in part by the State and in part by the local government. Federal highway funds have been used for independent sidewalk projects as well, but this has not been a major portion of the funding mix to date.

The Powell Bill Program is a state grant to municipalities for use in street system maintenance and construction activities. In the past, the Town allocated a considerable portion of these revenues for construction purposes. Over the years reserves built up, and the sidewalk program has drawn off these reserves. However, budgetary constraints since 2001 have led to a shift of new Powell Bill funds to cover maintenance and operations activities. Therefore, future Powell Bill allocations are not expected to yield substantial resources for construction purposes.

Both the Powell Bill reserves and the 2000 Transportation Bond

funds are limited funding sources that will eventually be depleted. Further, federal highway funds can be expected to provide only a portion of the future resource needs of the sidewalk construction program. For this reason, the development of future transportation bond initiatives will be critical for continuing implementation of the sidewalk construction program in the future.

The most direct source of public-sector funding for local governments will come from state agencies in North Carolina. Generally, these funds are made available to local governments based on grant-in-aid formulas. The single most important key to obtaining state grant funding is for local governments to have adopted plans for greenway, bicycle, pedestrian or trail systems in place prior to making an application for funding. A good starting website with links to many of the following programs is http://www.enr.state.nc.us/html/tax_credits.html.

In North Carolina, the Department of Transportation, Division of Bicycle and Pedestrian Transportation (DBPT) has been the single largest source of funding for bicycle, pedestrian and greenway projects, including non-construction projects such as brochures, maps, and public safety information for more than a decade. DBPT offers several programs in support of bicycle and pedestrian facility development. The following information is from NCDOT's interactive web site (www.ncdot.org). Contact the NCDOT, Division of Bicycle and Pedestrian Transportation at (919) 807-2804 for more information.

Transportation Improvement Program (TIP)

Transportation projects in North Carolina progress through a standard process of planning, design and construction. Improvements for bicycling and walking may be included in the TIP as part of the construction of a highway project or, where no highway project is programmed, as an independent project. Bicycle and pedestrian projects follow essentially the same TIP process as do highway projects. The Division of Bicycle and Pedestrian Transportation (DBPT) works with localities to create a statewide four-year schedule for funding projects using the locality's priority listing of needs along with the adopted project selection criteria. The DBPT compiles candidate bicycle and pedestrian projects to be considered for inclusion in the TIP from the following sources:

• The prioritized Metropolitan Transportation Improvement Program (MTIP) lists produced by the 17 Metropolitan Planning Organizations (MPOs), which have been derived from separate lists produced by communities comprising the MPO.

• Project requests that are made at the biennial TIP meetings or through written requests within 30 days of the meetings from the state's small urban areas, counties, public and private entities, and citizens.

• Internal DBPT assessment of statewide bicycle and pedestrian project needs. All project requests are documented and distinguished as independent or incidental (part of a highway project). Independent project requests are evaluated by DBPT using project selection criteria. A prioritized list of these projects is presented to the North Carolina Bicycle Committee. The Committee reviews the list, makes revisions and recommendations, and adopts a four-year schedule of projects. The adopted schedule is sent to the North Carolina Board of Transportation for approval and inclusion in the state's TIP.

Inclusion of a bicycle or pedestrian project in the TIP does not guarantee that it will be implemented; rather, it means that it will receive further study and will be implemented if feasible. Incidental projects are considered in conjunction with the planning study for the given highway or bridge project and implemented, if feasible.

For independent construction projects, DBPT conducts a detailed feasibility study, including cost estimates. If the project is determined to be feasible, DBPT prepares a more detailed planning study, which is reviewed and approved by the Bicycle and Pedestrian Task Force before being submitted to the Board of Transportation for funding authorization. Once the funding is authorized, project design and development begins.

For more information, visit http://www.ncdot.org/transit/bicycle/funding/funding_TIP.html

Bicycle and Pedestrian Planning Grant Initiative

This program was initiated by NCDOT in 2004, to provide

communities with planning grants in support of the completion of community-wide bicycle and pedestrian plans. NCDOT will continue this program through 2006 and beyond. For more information, visit http://www.itre.ncsu.edu/ptg/bikeped/ncdot/index.html

North Carolina Safe Routes to School Program

Recently, the state of North Carolina started the NC Safe Routes to School Program based off of the national program. The state has $15 million over the next 5 years for infrastructure improvements within 2 miles of schools. This funding can also be used towards the development of school related programs to improve safety and walkability initiatives. The state requires the completion of a competitive application to apply for funding, similar to the bicycle/pedestrian planning grants, and a workshop at the school to determine what improvements are needed. After a school has the workshop, it will have a good shot of getting that funding. For more information, contact Theresa Canales at NCDOT, (919) 733-2520.

Federal Aid Construction Funds

These funds are included in the National Highway System (NHS), Surface Transportation Program (STP), and Congestion Mitigation and Air Quality (CMAQ). The funds provide for the construction of pedestrian and bicycle transportation facilities. The primary source of funding for bicycle and pedestrian projects is STP Enhancement Funding.

State Construction Funds

These funds (not including the Highway Trust Fund for Urban Loops and Interchanges) may be used for the construction of sidewalks and bicycle accommodations that are a part of roadway improvement projects.

The North Carolina Conservation Tax Credit

This program provides an incentive (in the form of an income tax credit) for landowners that donate interests in real property for conservation purposes. Property donations can be fee simple or in the form of conservation easements or bargain sale. The goal of this program is to manage stormwater, protect water supply watersheds, retain working farms and forests, and set-aside greenways for

ecological communities, public trails, and wildlife corridors. (For more information see: http://ncctc.enr.state.nc.us/).

The Land and Water Conservation Fund (LWCF)

This is the largest source of federal grant money for states and local governments in regards to park, wildlife, and open space land acquisition. The state-and-local grant portion of the program provides up to 50 percent of the cost of a project, with the balance of the funds paid by states or municipalities. LWCF funds are apportioned by formula to all 50 states, the District of Columbia and territories. In North Carolina, the federally granted money is allocated through the State Division of Parks and Recreation. Cities, counties, state agencies, and school districts are eligible for LWCF fund monies. These funds can be used for outdoor recreation projects, including greenway acquisition, renovation, and greenway development. Projects require a 50 percent match. The allotment can vary from year to year. Between 1995 and 1998, no funds were provided for the state-and-local grant portion of the program. In fiscal year 2000, Congress approved stateside grant funding at $40 million. In FY 2001, $89 million was approved. In the current fiscal year 2006, the allotted money has been "zeroed" out again.

For more information and how to apply for a grant in North Carolina, visit http://ils.unc.edu/parkproject/lwcf/home1.html.

North Carolina Recreational Trails Program

The Recreational Trails Program is a grant program funded by Congress with money from the federal gas taxes paid on fuel used by off-highway vehicles. This program's intent is to meet the trail and trail-related recreational needs identified by the Statewide Comprehensive Outdoor Recreation Plan. Grant applicants must be able contribute 20% of the project cost with cash or in-kind contributions. Applications for funding may be obtained by contacting your regional trails specialist or the State Trails Program at (919) 715-8699.

North Carolina Parks and Recreation Trust Fund (PARTF)

Generally several million dollars a year are available to local governments across NC through this program. Applicable projects require a 50/50 match from the local government and no more

than $250,000 can be requested. The money can be used for the acquisition, development and renovation of recreational areas. The NC Division of State Parks manages the program along with the Recreational Resources Service. Visit http://www.partf.net/ for information on how to apply.

Clean Water Management Trust Fund

This fund was established in 1996 and has become one of the largest sources of money in North Carolina for land and water protection. At the end of each fiscal year, 6.5 percent of the unreserved credit balance in North Carolina's General Fund, or a minimum of $30 million, is placed in the CWMTF. The revenue of this fund is allocated as grants to local governments, state agencies and conservation non-profits to help finance projects that specifically address water pollution problems. Local governments may apply for grants to acquire easement or fee-simple interest in properties that (1) enhance or restore degraded waters, (2) protect unpolluted waters, and/or (3) contribute toward a network of riparian buffers and greenways for environmental, educational, and recreational benefits. For a history of awarded grants in North Carolina and more information about this fund and applications, visit http://www.cwmtf.net/.

Farmland Protection Trust Fund

Ranging from only a couple hundred thousand dollars to millions of dollars over the last several years, this program is funded through an allocation by the NC General Assembly to the NC Department of Agriculture and Consumer Services. It is a voluntary program designed to protect farmland from development by either acquiring property outright or acquiring conservation easements on the property. The program is administered by the Conservation Trust for North Carolina (CTNC). Questions about available funding should be directed to CTNC (Website: http://www.ctnc.org/).

Natural Heritage Trust Fund

Money from this fund may only be allocated to State agencies, so the Town of Holly Springs must work with State level partners to access this fund. The NHTF is used to acquire and protect land that has significant habitat value. Some large wetland areas may also qualify, depending on their biological integrity and characteristics. Additional information is available from the NC Natural Heritage Program. For more information and grant application information,

visit http://www.ncnhtf.org/.

North Carolina Wetlands Restoration Program (NCWRP)

This is a non-regulatory program established by the NC General Assembly in 1996. The goals of the NCWRP are to:

• Protect and improve water quality by restoring wetland, stream and riparian area functions and values lost through historic, current and future impacts.

• Achieve a net increase in wetland acreage, functions and values in all of North Carolina's major river basins.

• Promote a comprehensive approach for the protection of natural resources.

• Provide a consistent approach to address compensatory mitigation requirements associated with wetland, stream, and buffer regulations, and to increase the ecological effectiveness of compensatory mitigation projects.

Additional information about the program and potential funding assistance with the restoration or creation of wetlands can be found at www.h2o.enr.state.nc.us/wrp

Ecosystem Enhancement Program

Developed in 2003 as a new mechanism to facilitate improved mitigation projects for NC highways, this program will have money available for both restoration projects and protection projects that serve to enhance water quality and wildlife habitat in NC. Additional information is available by contacting the Natural Heritage Program in the NC Department of Environment and Natural Resources (NCDENR). For more information, resources, and links, visit http://www.nceep.net/pages/partners.html.

Agriculture Cost Share Program

Established in 1984, this program assists farmers with the cost of installing best management practices (BMPs) that benefit water quality. The program covers as much as 75 percent of the costs to implement BMPs. The NC Division of Soil and Water Conservation (within the NC Department of Environment and Natural Resources) administers this program through local Soil and Water

Conservation Districts (SWCD). For more information, visit http://www.enr.state.nc.us/DSWC/pages/agcostshareprogram.html.

Conservation Reserve Enhancement Program (CREP)

A joint effort between the NC Division of Soil and Water Conservation, the North Carolina Clean Water Management Trust Fund, the North Carolina Wetlands Restoration Program, and the United States Department of Agriculture to address water quality programs of specific river basins and watershed areas. This is a voluntary program to protect riparian lands that are currently in agricultural production. The program is managed by the NC Division of Soil and Water Conservation. For more information, visit http://www.enr.state.nc.us/DSWC/pages/crep.html.

North Carolina Conservation Tax Credit Program

An incentive program that encourages landowners to donate land or easements on their land for conservation purposes. Participants receive a state tax credit for the value of their donation. For more information see: http://ncctc.enr.state.nc.us.

NC Adopt-A-Trail Grant Program

Operated by the Trails Section of the NC Division of State Parks, annual grants are available to local governments for trail and facility construction. Grants are generally capped at about $5,000 per project and do not require a match. Applications are due in the fall. For more information, visit : http://ils.unc.edu/parkproject/trails/grant.html.

Urban and Community Forestry Assistance Program

The program operates as a cooperative partnership between the NC Division of Forest Resources and the USDA Forest Service, Southern Region. It offers small grants that can be used to plant urban trees, establish a community arboretum, or other programs that promote tree canopy in urban areas. To qualify for this program, a community must pledge to develop a street-tree inventory, a municipal tree ordinance, a tree commission, and an urban forestry-management plan. All of these can be funded through the program. For more information, contact the NC Division of Forest Resources. For more information and a grant application, contact the NC Division of Forest Resources and/or visit http://www.dfr.state.nc.us/urban/

urban_grantprogram.htm.

Water Resources Development Grant Program

The NC Division of Water Resources offers cost-sharing grants to local governments on projects related to water resources. Stream Restoration and Land Acquisition and Facility Development for Water-Based Recreation Projects are two of the categories of projects that are generally funded. For more information, see: http://www.ncwater.org/Financial_Assistance.

Small Cities Community Development Block Grants

State level funds are allocated through the NC Department of Commerce, Division of Community Assistance. These funds can be used to promote economic development and to serve low-income and moderate-income neighborhoods. Greenways that are part of a community's economic development plans may qualify for assistance under this program. Recreational areas that serve to improve the quality of life in lower income areas may also qualify. Approximately $50 million is available statewide to fund a variety of projects. For more information, visit http://www.hud.gov/offices/cpd/communitydevelopment/programs/stateadmin/.

North Carolina Health and Wellness Trust Fund

The NC Health and Wellness Trust Fund was created by the General Assembly as one of 3 entities to invest North Carolina's portion of the Tobacco Master Settlement Agreement. HWTF receives one-fourth of the state's tobacco settlement funds, which are paid in annual installments over a 25-year period.

Fit Together, a partnership of the NC Health and Wellness Trust Fund (HWTF) and Blue Cross and Blue Shield of North Carolina (BCBSNC) announces the establishment of Fit Community, a designation and grant program that recognizes and rewards North Carolina communities' efforts to support physical activity and healthy eating initiatives, as well as tobacco-free school environments. Fit Community is one component of the jointly sponsored Fit Together initiative, a statewide prevention campaign designed to raise awareness about obesity and to equip individuals, families and communities with the tools they need to

address this important issue.

All North Carolina municipalities and counties are eligible to apply for a Fit Community designation, which will be awarded to those that have excelled in supporting the following:

- physical activity in the community, schools, and workplaces
- healthy eating in the community, schools, and workplaces
- tobacco use prevention efforts in schools

Designations will be valid for two years, and designated communities may have the opportunity to reapply for subsequent two-year extensions. The benefits of being a Fit Community include:

- heightened statewide attention that can help bolster local community development and/or economic investment initiatives (highway signage and a plaque for the Mayor's or County Commission Chair's office will be provided)
- reinvigoration of a community's sense of civic pride (each Fit Community will serve as a model for other communities that are trying to achieve similar goals)
- use of the Fit Community designation logo for promotional and communication purposes.

The application for Fit Community designation is available on the Fit Together Web site:
www.FitTogetherNC.org/FitCommunity.aspx.

Fit Community grants are designed to support innovative strategies that help a community meet its goal to becoming a Fit Community. Eight to nine, two-year grants of up to $30,000 annually will be awarded to applicants that have a demonstrated need, proven capacity, and opportunity for positive change in addressing physical activity and/or healthy eating.

Blue Cross Blue Shield Grant

The Blue Cross and Blue Shield of North Carolina Foundation has a grants program called "Fit Together." The purpose of the program is to provide support to rural North Carolina communities

to improve community health by implementing innovative and integrated strategies to increase physical activity. Approximately $40,000 each is available for up to five grantees. Eligible applicants include nonprofit organizations in North Carolina with 501 c(3) status. Applicants must utilize the "5Ps approach" in their strategy to increase physical activity: preparation, promotions, programs, policies, and physical projects. Visit web site: www.bcbsnc.com/foundation/fitogether_grants.html.

D.3 Local Funding Sources

A number of local funding options have been grouped here under the primary banners of taxes, fees, loans, bonds, and other resources.

Taxes

Many communities have raised money through self-imposed increases in taxes and bonds. For example, Pinellas County residents in Florida voted to adopt a one-cent sales tax increase, which provided an additional $5 million for the development of the overwhelmingly popular Pinellas Trail. Sales taxes have also been used in Allegheny County, Pennsylvania, and in Boulder, Colorado to fund open space projects. A gas tax is another method used by some municipalities to fund public improvements.

A number of taxes provide direct or indirect funding for the operations of local governments. Some of them are:

Sales Tax

In North Carolina, the state has authorized a sales tax at the state and county levels. Local governments that choose to exercise the local option sales tax (all counties currently do), use the tax revenues to provide funding for a wide variety of projects and activities. Any increase in the sales tax, even if applying to a single county, must gain approval of the state legislature. In 1998, Mecklenburg County was granted authority to institute a one-half cent sales tax increase for mass transit.

Property Tax

Property taxes generally support a significant portion of a municipality's activities. However, the revenues from property taxes can also be used to pay debt service on general obligation

bonds issued to finance greenway system acquisitions. Because of limits imposed on tax rates, use of property taxes to fund greenways could limit the municipality's ability to raise funds for other activities. Property taxes can provide a steady stream of financing while broadly distributing the tax burden. In other parts of the country, this mechanism has been popular with voters as long as the increase is restricted to parks and open space. Note, other public agencies compete vigorously for these funds, and taxpayers are generally concerned about high property tax rates.

Excise Taxes

Excise taxes are taxes on specific goods and services. These taxes require special legislation and the use of the funds generated through the tax are limited to specific uses. Examples include lodging, food, and beverage taxes that generate funds for promotion of tourism, and the gas tax that generates revenues for transportation related activities.

Fees

Several fee options that have been used by other local governments are listed here:

Stormwater Utility Fees

Stormwater charges are typically based on an estimate of the amount of impervious surface on a user's property. Impervious surfaces (such as rooftops and paved areas) increase both the amount and rate of stormwater runoff compared to natural conditions. Such surfaces cause runoff that directly or indirectly discharge into public storm drainage facilities and creates a need for stormwater management services. Thus, users with more impervious surface are charged more for stormwater service than users with less impervious surface.

The rates, fees, and charges collected for stormwater management services may not exceed the costs incurred to provide these services. The costs that may be recovered through the stormwater rates, fees, and charges includes any costs necessary to assure that all aspects of stormwater quality and quantity are managed in accordance with federal and state laws, regulations, and rules. Greenway sections may be purchased with stormwater fees, if the property in question is

used to mitigate floodwater or filter pollutants.

Impact Fees

Impact fees, which are also known as capital contributions, facilities fees, or system development charges, are typically collected from developers or property owners at the time of building permit issuance to pay for capital improvements that provide capacity to serve new growth. The intent of these fees is to avoid burdening existing customers with the costs of providing capacity to serve new growth ("growth pays its own way"). Greenway impact fees are designed to reflect the costs incurred to provide sufficient capacity in the system to meet the additional needs of a growing community. These charges are set in a fee schedule applied uniformly to all new development. Communities that institute impact fees must develop a sound financial model that enables policy makers to justify fee levels for different user groups, and to ensure that revenues generated meet (but do not exceed) the needs of development. Factors used to determine an appropriate impact fee amount can include: lot size, number of occupants, and types of subdivision improvements.

If Holly Springs is interested in pursuing open space impact fees, it will require enabling legislation to authorize the collection of the fees.

Exactions

Exactions are similar to impact fees in that they both provide facilities to growing communities. The difference is that through exactions it can be established that it is the responsibility of the developer to build the greenway or pedestrian facility that crosses through the property, or adjacent to the property being developed.

Installment Purchase Financing

As an alternative to debt financing of capital improvements, communities can execute installment/ lease purchase contracts for improvements. This type of financing is typically used for relatively small projects that the seller or a financial institution is willing to finance or when up-front funds are unavailable. In a lease purchase contract the community leases the property or improvement from the seller or financial institution. The

lease is paid in installments that include principal, interest, and associated costs. Upon completion of the lease period, the community owns the property or improvement. While lease purchase contracts are similar to a bond, this arrangement allows the community to acquire the property or improvement without issuing debt. These instruments, however, are more costly than issuing debt.

Partnerships

Another, often overlooked, method of funding pedestrian systems and greenways is to partner with public agencies and private companies and organizations. Partnerships engender a spirit of cooperation, civic pride and community participation. The key to the involvement of private partners is to make a compelling argument for their participation.

Major employers and developers should be identified and provided with a "Benefits of Walking"-type handout for themselves and their employees. Very specific routes which make those critical connections to place of business would be targeted for private partners' monetary support, but only after a successful master planning effort. People rarely fund issues before they understand them and their immediate and direct impact. Potential partners include major employers which are located along or accessible to pedestrian facilities such as multi-use paths or greenways. Name recognition for corporate partnerships would be accomplished through signage trail heads or interpretive signage along greenway systems.

Utilities often make good partners and many trails now share corridors with them. Money raised from providing an easement to utilities can help defray the costs of maintenance. It is important to have a lawyer review the legal agreement and verify ownership of the subsurface, surface or air rights in order to enter into an agreement.

In-Lieu-Of Fees

As an alternative to requiring developers to dedicate on-site greenway sections that would serve their development, some communities provide a choice of paying a front-end charge for off-site protection of pieces of the larger system. Payment is generally a condition of development approval and recovers

the cost of the off-site land acquisition or the development's proportionate share of the cost of a regional facility serving a larger area. Some communities prefer in-lieu-of fees. This alternative allows community staff to purchase land worthy of protection rather than accept marginal land that meets the quantitative requirements of a developer dedication but falls a bit short of qualitative interests.

Bonds and Loans

Bonds have been a very popular way for communities across the country to finance their pedestrian and greenway projects. A number of bond options are listed below. Contracting with a private consultant to assist with this program may be advisable. Since bonds rely on the support of the voting population, an education and awareness program should be implemented prior to any vote.

Billings, Montana used the issuance of a bond in the amount of $599,000 to provide the matching funds for several of their TEA-21 enhancement dollars. Austin, Texas has also used bond issues to fund a portion of their bicycle and trail system.

Revenue Bonds

Revenue bonds are bonds that are secured by a pledge of the revenues from a certain local government activity. The entity issuing bonds, pledges to generate sufficient revenue annually to cover the program's operating costs, plus meet the annual debt service requirements (principal and interest payment). Revenue bonds are not constrained by the debt ceilings of general obligation bonds, but they are generally more expensive than general obligation bonds.

General Obligation Bonds

Cities, counties, and service districts generally are able to issue general obligation (G.O.) bonds that are secured by the full faith and credit of the entity. In this case, the local government issuing the bonds pledges to raise its property taxes, or use any other sources of revenue, to generate sufficient revenues to make the debt service payments on the bonds. A general obligation pledge is stronger than a revenue pledge, and thus may carry a lower interest rate than a revenue bond. Frequently, when local governments issue G.O. bonds for public enterprise

improvements, the public enterprise will make the debt service payments on the G.O. bonds with revenues generated through the public entity's rates and charges. However, if those rate revenues are insufficient to make the debt payment, the local government is obligated to raise taxes or use other sources of revenue to make the payments. G.O. bonds distribute the costs of land acquisition and greenway development and make funds available for immediate purchases and projects. Voter approval is required.

Special Assessment Bonds

Special assessment bonds are secured by a lien on the property that benefits by the improvements funded with the special assessment bond proceeds. Debt service payments on these bonds are funded through annual assessments to the property owners in the assessment area.

State Revolving Fund (SRF) Loans

Initially funded with federal and state money, and continued by funds generated by repayment of earlier loans, State Revolving Funds (SRFs) provide low interest loans for local governments to fund water pollution control and water supply related projects including many watershed management activities. These loans typically require a revenue pledge, like a revenue bond, but carry a below market interest rate and limited term for debt repayment (20 years).

D.4 Other Local Options

Local Capital Improvements Program

In communities that can afford it, a yearly appropriation for greenway and trail development in the capital improvements program is another option. In Raleigh, for example, the greenways system has been developed over many years through a dedicated source of annual funding that has ranged from $100,000 to $500,000, administered through the Recreation and Parks Department.

Local Trail Sponsors

A sponsorship program for trail amenities allows smaller donations to be received from both individuals and businesses. Cash donations could be placed into a trust fund to be accessed for certain construction or acquisition projects associated with the greenways and open space system. Some recognition of the donors is appropriate and can be accomplished through the placement of a plaque, the naming of a trail segment, and/or special recognition at an opening ceremony. Types of gifts other than cash could include donations of services, equipment, labor, or reduced costs for supplies.

Volunteer Work

It is expected that many citizens will be excited about the development of a greenway corridor. Individual volunteers from the community can be brought together with groups of volunteers form church groups, civic groups, scout troops and environmental groups to work on greenway development on special community work days. Volunteers can also be used for fund-raising, maintenance, and programming needs.

D.5 Private Foundations and Organizations

Many communities have solicited greenway funding assistance from private foundations and other conservation-minded benefactors. Below are a few examples of private funding opportunities available in North Carolina.

Land for Tomorrow Campaign

Land for Tomorrow is a diverse partnership of businesses, conservationists, farmers, environmental groups, health professionals and community groups committed to securing support from the public and General Assembly for protecting land, water and historic places. The campaign is asking the North Carolina General Assembly to support issuance of a bond for $200 million a year for five years to preserve and protect its special land and water resources. Land for Tomorrow will enable North Carolina to reach a goal of ensuring that working farms and forests; sanctuaries for wildlife; land bordering streams, parks and greenways; land that helps strengthen communities and promotes job growth; historic downtowns and neighborhoods; and more, will be there to enhance the quality of life for generations to come.

For more information, visit http://www.landfortomorrow.org/

American Greenways Eastman Kodak Awards

The Conservation Fund's American Greenways Program has teamed with the Eastman Kodak Corporation and the National Geographic Society to award small grants ($250 to $2,000) to stimulate the planning, design and development of greenways. These grants can be used for activities such as mapping, conducting ecological assessments, surveying land, holding conferences, developing brochures, producing interpretive displays, incorporating land trusts, and building trails. Grants cannot be used for academic research, institutional support, lobbying or political activities. For more information visit The Conservation Fund's website at: www.conservationfund.org

The Robert Wood Johnson Foundation

The Robert Wood Johnson Foundation was established as a national philanthropy in 1972 and today it is the largest U.S. foundation devoted to improving the health and health care of all Americans. Grant making is concentrated in four areas:

- To assure that all Americans have access to basic health care at a reasonable cost
- To improve care and support for people with chronic health conditions
- To promote healthy communities and lifestyles
- To reduce the personal, social and economic harm caused by substance abuse: tobacco, alcohol, and illicit drugs

For more specific information about what types of projects are funded and how to apply, visit http://www.rwjf.org/applications/.

The Trust for Public Land

Land conservation is central to TPL's mission. Founded in 1972, the Trust for Public Land is the only national nonprofit working exclusively to protect land for human enjoyment and well being. TPL helps conserve land for recreation and spiritual nourishment and to improve the health and quality of life of American communities. TPL's legal and real estate specialists work with

landowners, government agencies, and community groups to:

- Create urban parks, gardens, greenways, and riverways
- Build livable communities by setting aside open space in the path of growth
- Conserve land for watershed protection, scenic beauty, and close-to home recreation safeguard the character of communities by preserving historic landmarks and landscapes.

For more information, visit http://www.tpl.org/.

Z. Smith Reynolds Foundation

This Winston-Salem based Foundation has been assisting the environmental projects of local governments and non-profits in North Carolina for many years. They have two grant cycles per year and generally do not fund land acquisition. However, they may be able to support Holly Springs in other areas of greenways development. More information is available at www.zsr.org.

North Carolina Community Foundation

The North Carolina Community Foundation, established in 1988, is a statewide foundation seeking gifts from individuals, corporations, and other foundations to build endowments and ensure financial security for nonprofit organizations and institutions throughout the state. Based in Raleigh, North Carolina, the foundation also manages a number of community affiliates throughout North Carolina, that make grants in the areas of human services, education, health, arts, religion, civic affairs, and the conservation and preservation of historical, cultural, and environmental resources. The foundation also manages various scholarship programs statewide. Web site: http://nccommunityfoundation.org/

Bank of America Charitable Foundation, Inc.

The Bank of America Charitable Foundation is one of the largest in the nation. The primary grants program is called Neighborhood Excellence, which seeks to identify critical issues in local communities. Another program that applies to greenways is the Community Development Programs, and specifically the Program Related Investments. This program targets low and moderate

income communities and serves to encourage entrepreneurial business development. Visit the web site for more information: www.bankofamerica.com/foundation.

National Trails Fund

American Hiking Society created the National Trails Fund in 1998, the only privately supported national grants program providing funding to grassroots organizations working toward establishing, protecting and maintaining foot trails in America. 73 million people enjoy foot trails annually, yet many of our favorite trails need major repairs due to a $200 million backlog of badly needed maintenance. National Trails Fund grants help give local organizations the resources they need to secure access, volunteers, tools and materials to protect America's cherished public trails. For 2005, American Hiking distributed over $40,000 in grants thanks to the generous support of Cascade Designs and L.L.Bean, the program's Charter Sponsors. To date, American Hiking has granted more than $240,000 to 56 different trail projects across the U.S. for land acquisition, constituency building campaigns, and traditional trail work projects. Awards range from $500 to $10,000 per project.

What types of projects will American Hiking Society consider? Securing trail lands, including acquisition of trails and trail corridors, and the costs associated with acquiring conservation easements. Building and maintaining trails which will result in visible and substantial ease of access, improved hiker safety, and/or avoidance of environmental damage. Constituency building surrounding specific trail projects - including volunteer recruitment and support. Web site: www.americanhiking.org/alliance/fund.html.

Appendix E Glossary

E.0 Overview

The material in this glossary is largely taken from the International Pedestrian Lexicon available online at: http://user.itl.net/~wordcraf/lexicon.html#a. Other definitions came from a variety of other sources.

E.1 Definitions

AASHTO – American Association of State Highway and Transportation Officials: it is a nonprofit, nonpartisan association representing highway and transportation departments of all transportation modes in the 50 states, the District of Columbia and Puerto Rico.

ADA – American Disabilities Act of 1991. The Act gives civil rights protections to individuals with disabilities including equal opportunities in public accommodations, employment, transportation, State and local government services, and telecommunications.

Advance stop lines - applies to a stop line placed prior to a crosswalk, to either prevent encroachment, or to improve visibility it plays an important safety role especially in multi-lane roads

Alternative Transportation Network – a connected system for travel using transportation other than private cars, such as walking, bicycling, rollerblading, carpooling and transit

Arterial connections – interconnected corridors designed to accommodate a large volume of through traffic

Bargain sale - sale of a property at less than the fair market value. The difference between a bargain sale price and fair market value often qualifies as a tax-deductible charitable contribution.

BGMPO – Burlington Graham Metropolitan Planning Organization

Blank walls – relatively large walls of empty surface that provide opportunity for vandalism with graffiti. Set backs, special lighting, and aesthetic architectural interruptions are possible blank wall treatments.

Blighted building – a structure whose condition within the town, neighborhood or city is detrimental to the physical, social, and/or economic well-being of that community

Bridge culvert – a sewer or drain crossing used for the transference of surface water from a bridge

Buffer zone - an area of land specifically designed to separate one zoning use from another

Bulb-out - extended pavement to narrow roadway, or pinch through fare, or provide space for bus stop, bench, etc.

CAMPO - Captial Area Metropolitan Planning Organization

Concurrent signal timing - motorists running parallel to a crosswalk are allowed to turn into and through the crosswalk (left or right) after yielding to pedestrians

Condemnation - the taking of private property for public use, with adequate compensation to the owner, under the right of eminent domain

Connectivity - the logical and physical interconnection of functionally related points so that people can move among them

Conservation easement - a legally binding agreement not to develop part of a property, but to leave it "natural" permanently or for some designated very long period of time regardless of ownership transfer

Corridor - a spatial link between two or more significant locations

Crosswalk - a designated point on a road at which some means are employed to assist pedestrians wishing to cross. They are designed to keep pedestrians together where they can be seen by motorists, and where they can cross most safely with the flow of vehicular traffic.

Curb cut - a ramp leading smoothly down from a sidewalk to an intersecting street, rather than abruptly ending with a curb

Curb extension - a section of sidewalk at an intersection or midblock crossing that reduces the crossing width for pedestrians and is intended to slow the speed of traffic and increase driver awareness

Curb ramp - interruption in the curb, as for a driveway

Driveway apron – the section of a driveway between the sidewalk and the curb

Eminent domain - interruption in the curb, as for a driveway

EPA – Environmental Protection Agency

Fee simple purchase – an outright purchase of the land by municipality

FHWA – Federal Highway Association

First right of refusal - the right specified in an agreement to have the first opportunity to purchase or lease a given property before it is offered to others

Fitness Trail - a pathway upon which users jog or walk from station to station to perform various exercise tasks

Greenway - a linear open space; a corridor composed of natural vegetation. Greenways can be used to create connected networks of open space that include traditional parks and natural areas.

High volume artery – an important transportation corridor that is used by large traffic levels

Hydrologic resources – stream and sewer corridors and buffer zones that can be used to facilitate the building of greenways

Incentive zoning - a system by which zoning incentives are provided to developers on the condition that specific physical, social, or cultural benefits are provided to the community

Intersection - an area where two or more pathways or roadways join together

Islands of vegetation - a landscaping feature that is planted with flora chosen for its ability to remove pollution and toxins. These spaces manage stormwater runoff from impervious surfaces; the water is slowed down, preventing erosion and allowing water to be absorbed into the ground.

Leaseback - the process of selling a property and also entering into a lease to continue using that property

Linear stream corridor - generally consists of the stream channel, floodplain, and transitional upland fringe aligned linearly

LPI – Leading pedestrian interval. Pedestrians are given the signal to begin crossing before parallel traffic.

Median - a median is a barrier, constructed of concrete, asphalt, or landscaping, that separates two directions of traffic

Median refuge island - island in the median, that offers a stopping or halfway point for a pedestrian

MPO – Metropolitan Planning District

MST – Mountains-to-Sea Trail

Municipal boundary – the limit of municipal jurisdiction

Nature trail - a marked trail designed to lead people through a natural environment which highlights and protects resources

NCDOT – North Carolina Department of Transportation

Negotiated dedications - a local government may ask a landowner to enter into negotiations for certain parcels of land that are deemed beneficial to the protection and preservation of specific parcel of land

Off-road trail – paths or trails in areas not served by the street system, such as parks and greenbelt corridors. Off-street paths are intended to serve both recreational uses and other trips, and may accommodate other non-motorized travel modes in addition to walking.

On-road pedestrian facility – any sidewalk, curb, or crosswalk designed for pedestrian use

Open space - empty or vacant land which is set aside for public or private use and will not be developed. The space may be used for passive or active recreation, or may be reserved to protect or buffer natural areas.

Overlay zone - a zone or district created by the local legislature for the purpose of conserving natural resources or promoting certain types of development. Overlay zones are imposed over existing zoning districts and contain provisions that are applicable in addition to those contained in the zoning law.

Pedestrian - a person on foot or a person on roller skates, roller blades, child's tricycle, non-motorized wheelchair, skateboard, or other non-powered vehicles (excluding bicycles)

Pedestrian corridor – refers to any on-road sidewalks

Planned unit development (PUD) - a project or subdivision that includes common property that is owned and maintained by a homeowners' association for the benefit and use of the individual PUD unit owners

Pocket park - a small area accessible to the general public that is often of primarily environmental, rather than recreational, importance; they can be urban, suburban or rural and often feature as part of urban regeneration plans in inner-city areas to

provide areas where wild life can establish a foothold.

Preservation easement – a voluntary legal agreement that protects historic, archaeological, or cultural resources on a property. The easement provides assurance to the property owner that intrinsic values will be preserved through subsequent ownership. In addition, the owner may obtain substantial tax benefits.

Public Access Easement – a voluntary legal agreement which grants a municipality a perpetual right-of-way and easement for public access and public benefit

Quality of life - a measure of the standard of living which considers non-financial factors such as health, functional status and social opportunities that are influenced by disease, injury, treatment or social and political policy

Retrofit - the redesign and reconstruction of an existing facility or subsystem to incorporate new technology, to meet new requirements, or to otherwise provide performance not foreseen in the original design

Right turn cut-off - the channel created in larger intersection by a very long turning radius and the construction of a pedestrian island, to which the pedestrian must cross before being in the formal intersection that is controlled by lights. The right-turn cut-off allows continuous right turns at fairly high speeds without stopping but the drivers who are meant to but at times do not yield to pedestrians.

Roundabout - traffic calming device at which traffic streams circularly around a central island after first yielding to the circulating traffic

ROW (right of way) - an easement held by the local jurisdiction over land owned by the adjacent property owners that allows the jurisdiction to exercise control over the surface and above and below the ground of the right-of-way; usually designated for passage

RTOR – Right turn on red

Sidewalk - an improved facility intended to provide for pedestrian movement; usually, but not always, located in the public right-of-way adjacent to a roadway. Typically constructed of concrete, but can be made with asphalt, bricks, stone, wood, and other materials.

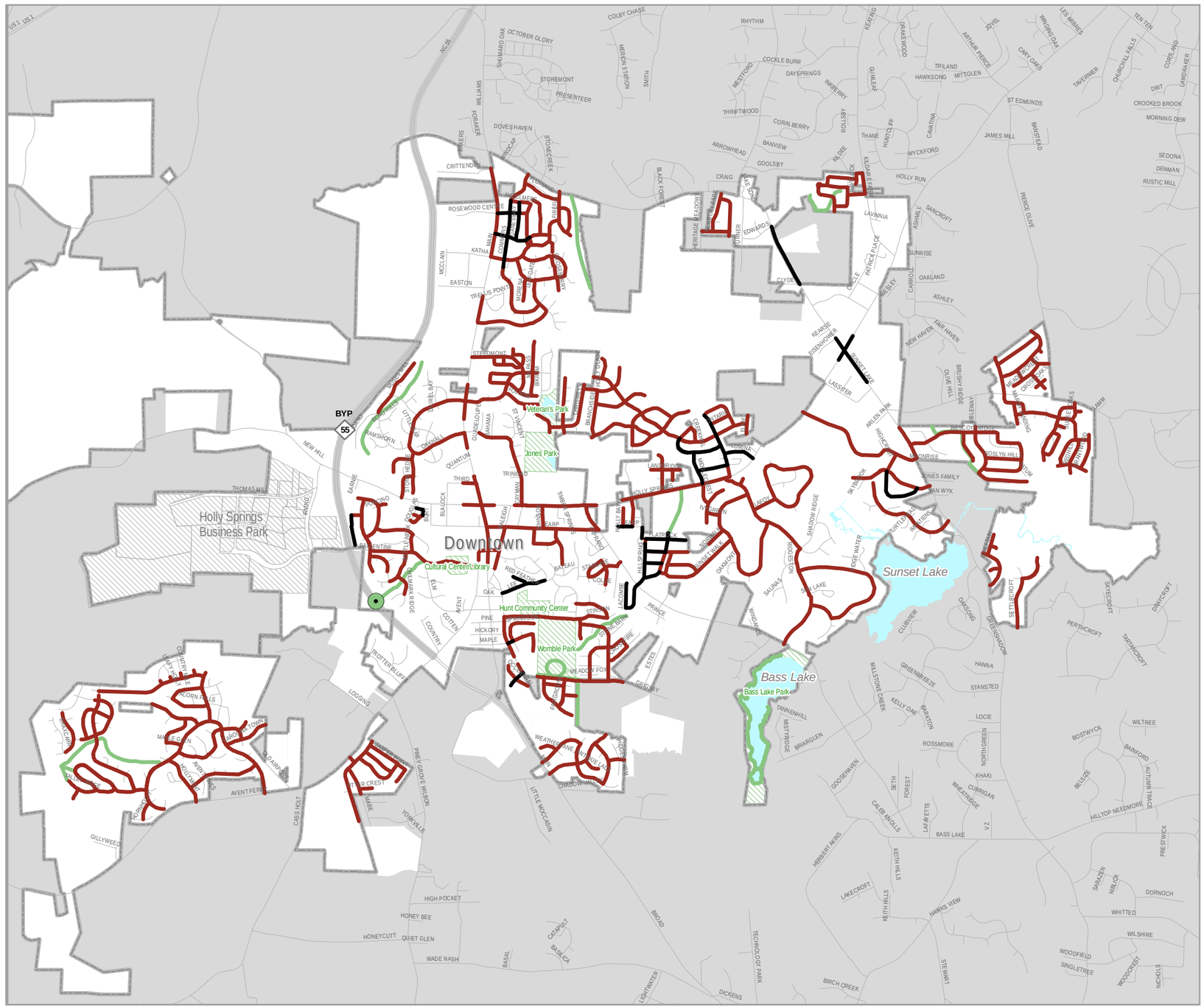
Thoroughfare - a public road from one place to another, designed for high traffic volumes and essential connections

TND (traditional neighborhood development) - an area of land developed in a planned fashion for a compatible mixture of residential units for various income levels and nonresidential commercial and workplace uses, with a high priority placed on access to open spaces

Traffic calming - a range of measures that reduce the impact of vehicular traffic on residents, pedestrians and cyclists - most commonly on residential streets, but also now on commercial streets

Trip attractor - a location which, because of what it contains, generates itself as a destination for people

Village center - an area in a community where people naturally congregate



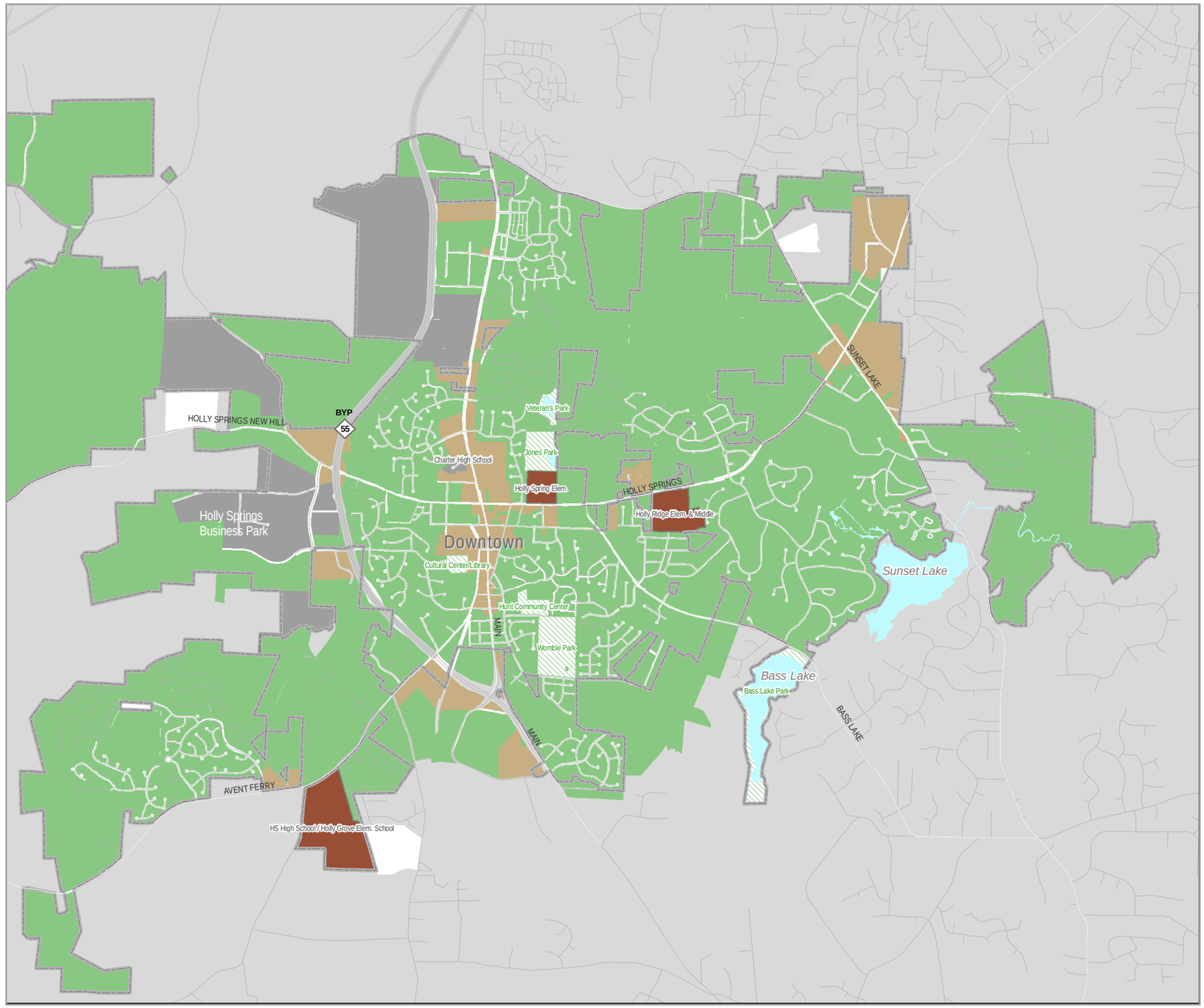
Existing Conditions

Legend

- Existing Grade Sep. Pedestrian Crossing
- Existing Sidewalk - One Side
- Existing Sidewalk - Both Sides
- Existing Greenway
- Road
- NC 55 Bypass
- Town Boundary
- Lake
- Park/Recreation Facility
- Business Park

1 Miles

N W E S



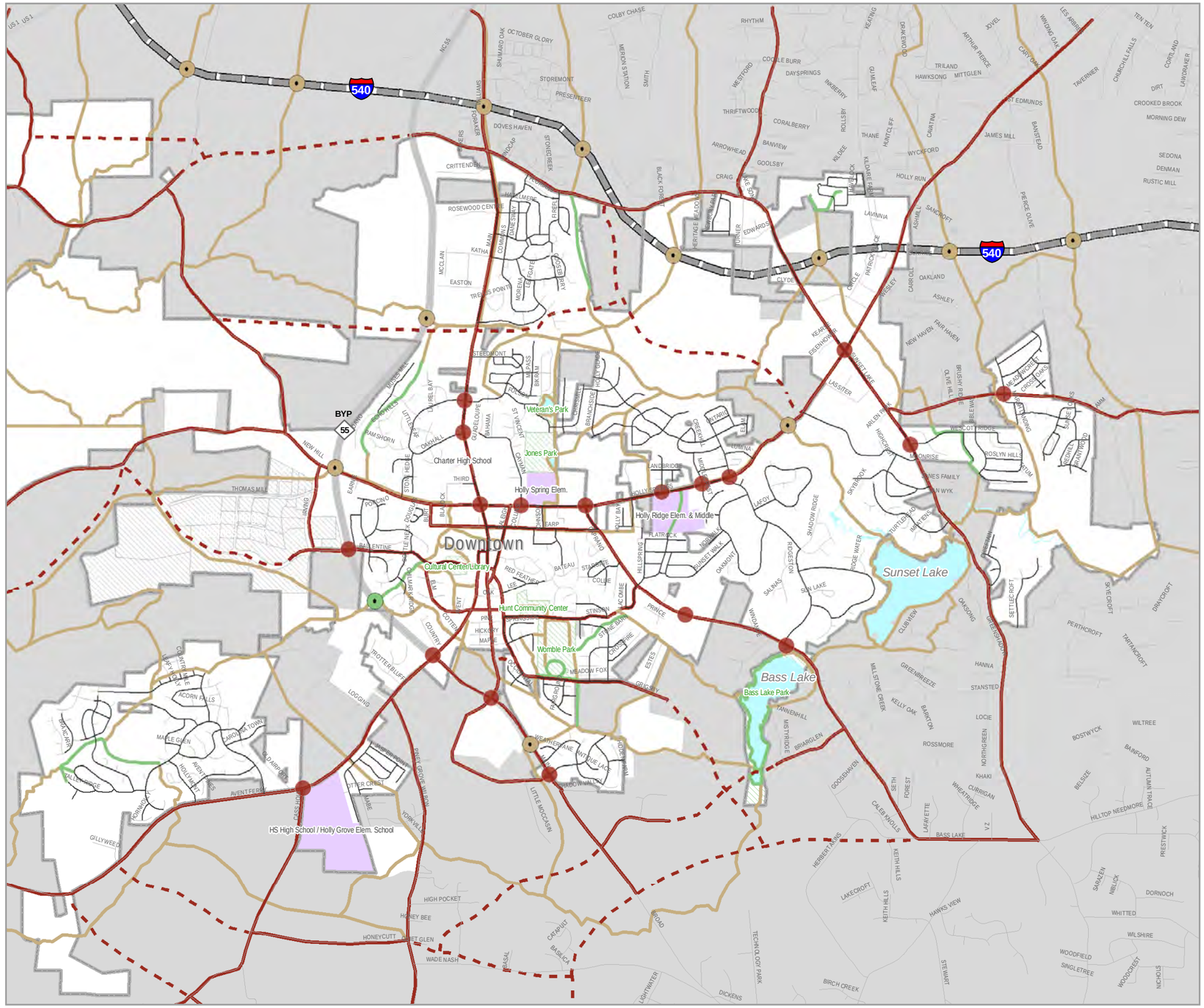
Current Land Use

Legend

- Existing Street
- NC 55 Bypass
- Town Boundary
- Lake
- Park/Recreation Facility
- School
- Residential
- Commercial/Mixed Use
- Industrial/Warehouse

1 Miles

N
W E
S



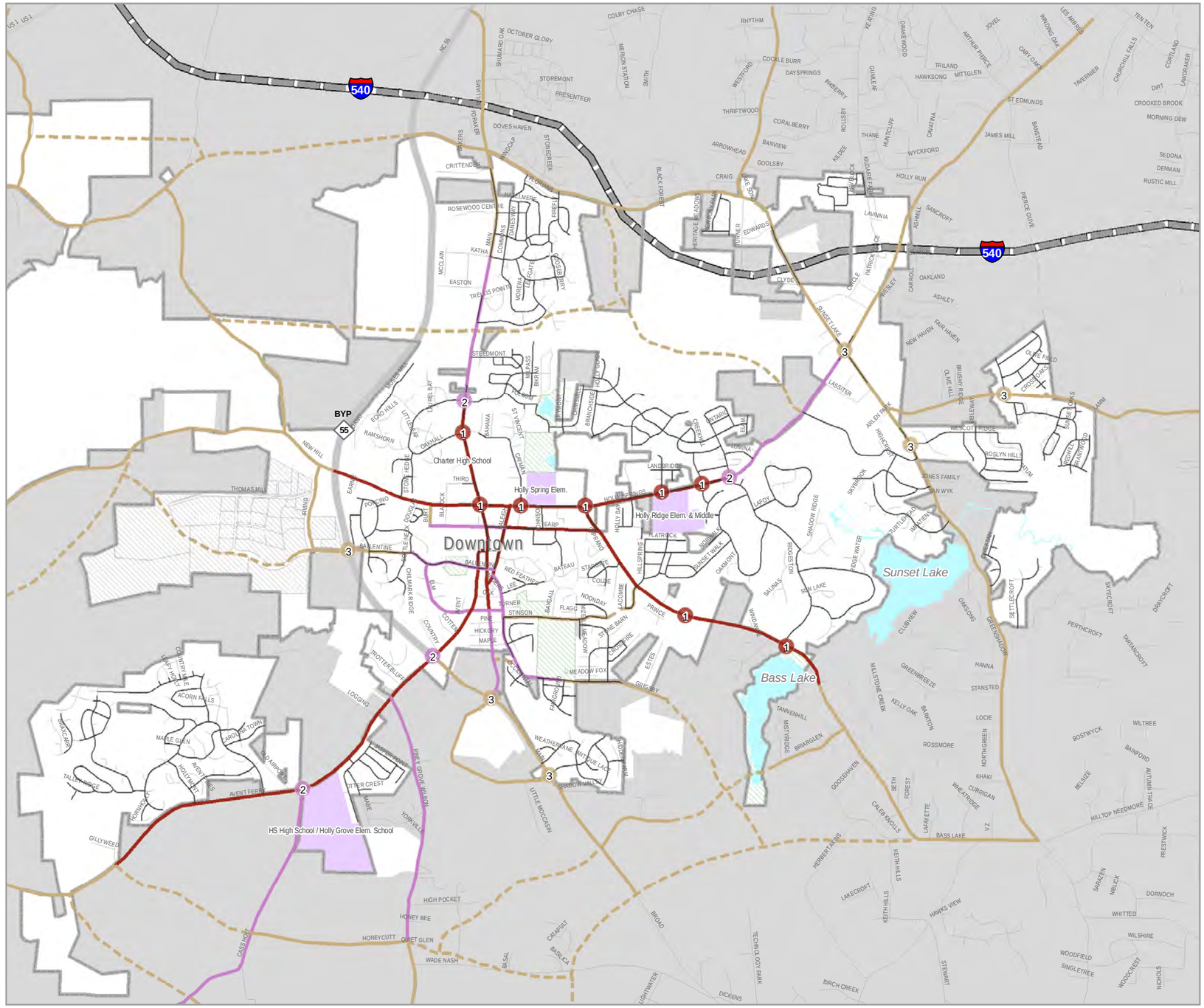
Pedestrian Network

Legend

- Intersection Improvement Site
- Proposed Grade Sep. Pedestrian Crossing
- Existing Grade Sep. Pedestrian Crossing
- Sidewalk Project - Existing Road
- Sidewalk Project - Future Road
- Existing Greenway
- Proposed Greenway
- Existing Sidewalk
- Road
- NC 55 Bypass
- I-540 - Future Corridor
- Town Boundary
- School
- Park/Recreation Facility
- Business Park
- Lake

1 Miles

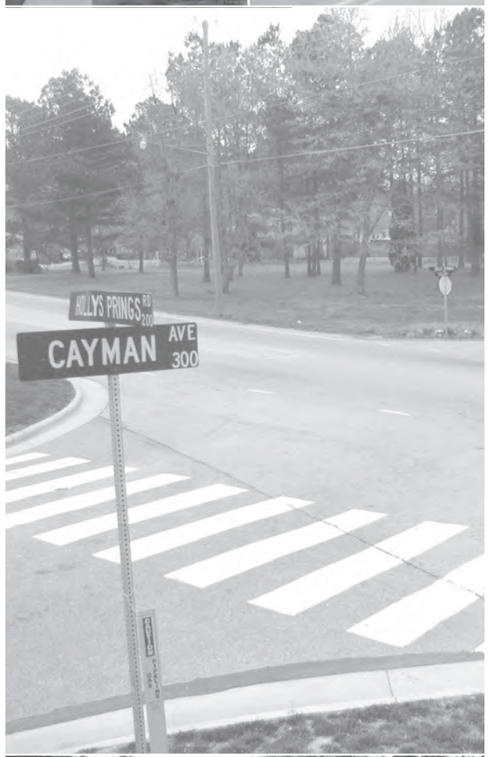
N
W E
S

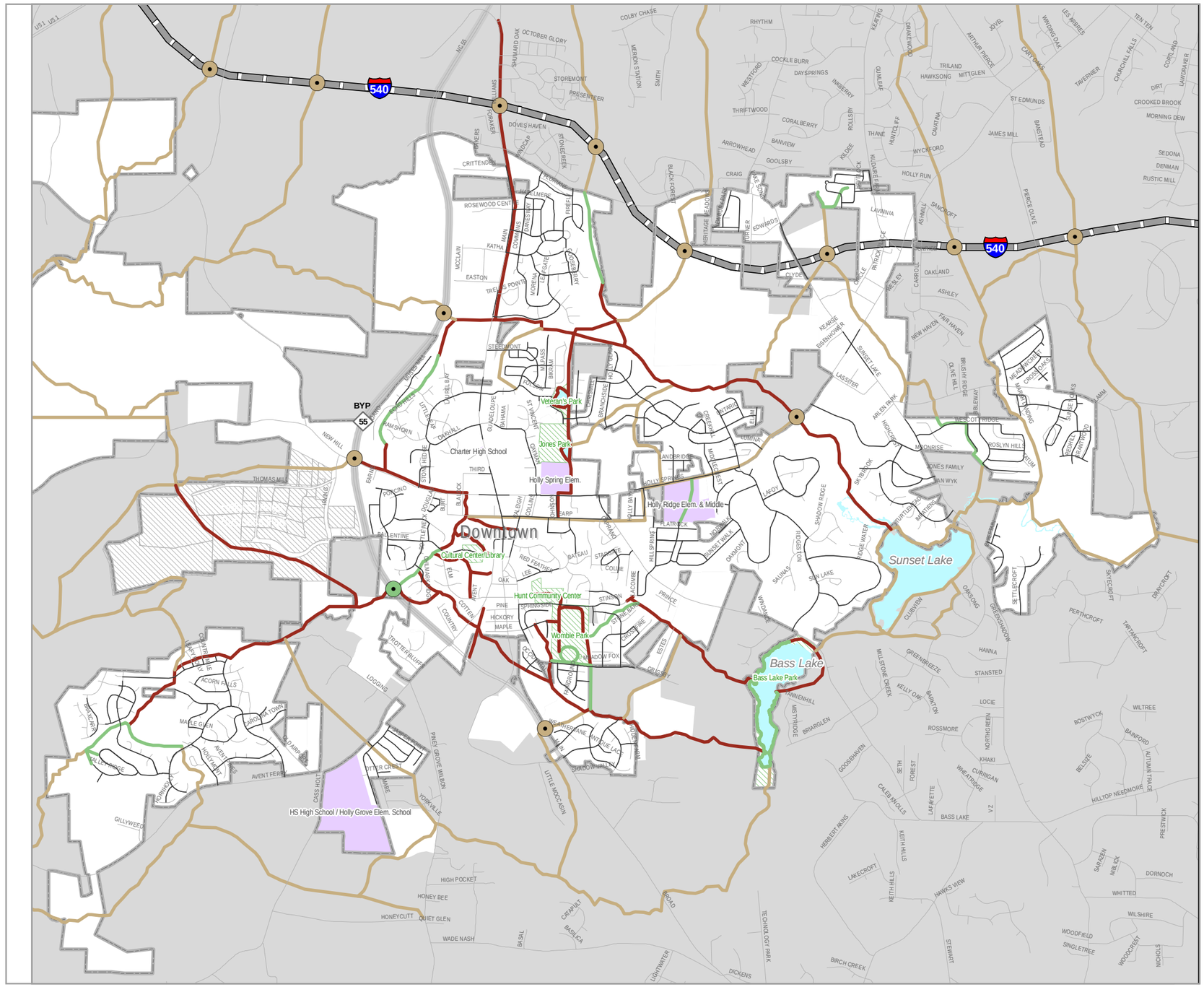


On-road Prioritization

Intersection Improvement Projects	Road 1	Road 2	Reason	Sight Distance	Signage (Y/N)	Controlled/ Uncontrolled	Curb Ramp (Y/N)	Curb Radius	Marked Crosswalk (Y/N)	Crosswalk Condition	Pedestrian Xing Signal (Y/N)	Curb Extension (Y/N)	Sidewalk	Speed limit	Median island	Recommendations (curb extentions, marked crosswalks, countdown signals, sinage, reduction of curb radius, median islands, high visibility, advance warning signal/signage, traffic calming)
1	Holly Springs Road	Main Street	Major Intersection	OK	N	Controlled Stop Light	Yes (all)	OK, could see some reduction	Y (2 solid lines)	OK	Y, Push-button signal, not countdown	N	Y (Sidewalk everywhere but doesn't continue on N-S on east side of Main St.	35 (all ways)	Yes, but not a refuge	*Crosshatch crosswalks or texture *Extend median islands for refuge *Extend sidewalks all ways away from intersection *Add countdown to ped xing signal
2	Holly Springs Road	Cayman	School	Ridge towards town, not great	N	Controlled Stop Signs	Yes (at crosswalk over Cayman)	OK	Y (on north side of Holly Springs Rd. across Cayman)	Good	N	N	Y (On north side of Holly Springs Rd and east side of Cayman)	20 - Cayman 35 - Holly Springs Rd.	N	No recommendation because connection to south is lacking and there is another crosswalk closer to school but if there is one: *Marked crosswalk over Holly Springs Road *Sidewalk on south side of Holly Springs Road with crosswalk over Collins *Median island for refuge *Advance warning signs
3	Holly Springs Road	Cobblepoint	School	OK	Yes in school vicinity along Holly Springs Rd.	Controlled Stop Signs	Y	OK	Only on south side of Holly Springs Rd across Elementary school entrance	OK, some cracking	N	N	No sidewalk extending to school or on west side of Cobblepoint	20 - residential 35- Holly Springs Rd.	N	*Restripe and create median island for refuge *Advanced warning signs and lights *Overhanging flashing speed reduction in school zone *Extend sidewalk into school grounds *Crossing guard during school hours
4	Holly Springs Road	Middlecrest	School	OK	Yes, pointing towards crosswalk	Controlled Stop Signs	Y	Average, could see some reduction	Y (on west side crossing of Holly Springs Rd.)	OK	N	N	Sidewalk both sides of Holly Springs Rd.; Sidewalk east side of Middlecrest (South) and west side of Middlecrest	25 - residential 35 - Holly Springs Rd.	N	*Restripe and create median island for refuge *Advanced warning signs and lights *Overhanging flashing speed reduction in school zone *Crossing guard during school hours *Marked crosswalks across Middlecrest both sides
5	Holly Springs Road	Linksland	Neighborhood Connection	Poor to east	N	Controlled Stop Signs	N	Average, could see some reduction	N	N/A	N	N	N	35 - Holly Springs 20 - Linksland	N	*Need sidewalk on both roads *Marked crosswalk across Holly Springs Rd. and across Linksland (north side) *Advanced warning signs and lights *Need curb cuts
6	Holly Springs Road	Sunset Lake	Major Intersection	OK	N	Controlled Stop Light	Y	Average, could see some reduction	Y (except for east side parallel to Sunset Lake Rd.)	OK	Y, Push-button signal, not countdown	N	Y (sidewalk everywhere)	35 - Holly Springs 35 - Sunset Lake	Yes, median islands everywhere but not a refuge	*Crosshatch crosswalks or texture *Extend median islands for refuge *Add crosswalk to Sunset Lake Rd. (N-S) on east side *Add countdown to ped xing signal
7	NC 55 Bypass	Ballentine	Bypass	OK	N	Controlled Stop Signs	N	N	N	N/A	N	N	No sidewalk	Hwy 55 - 55	N	Currently not connecting anything but Business Park so no connection yet but if there is one: *Add stoplight - ped countdown signals, marked crosswalks, sidewalks *Big center highway refuge island
8	NC 55 Bypass	Avent Ferry	Bypass	OK, but high speed makes it tough	N	Controlled Stop Light	N	Wide, could use reduction	N	N/A	N	N	No sidewalk	35 - Avent Ferry Hwy 55 - 45 or 55	Y	*Need sidewalk on both sides of Avent Ferry *Countdown pedestrian signals *Makred crosswalks across Hwy 55 - large hatch *Reduce speed of Hwy 55 *Pedestrian refuge island
9	NC 55 Bypass	South Main Street	Bypass	OK, but high speed makes it tough	N	Controlled Stop Light	N	Wide, could use reduction	N	N/A	N	N	No sidewalk	35? - Main St. Hwy 55 - 45 or 55	Y	*Need sidewalk on both sides of Main St./Ralph Stephens *Countdown pedestrian signals *Makred crosswalks across Hwy 55 - large hatch *Reduce speed of Hwy 55 *Pedestrian refuge island
10	NC 55 Bypass	Ralph Stephens/Teal Lake	Bypass	OK, but high speed makes it tough	N	Controlled Stop Signs	N	OK	N	N/A	N	N	Sidewalk only on south side of Teal Lake	25 - Teal Lake Hwy 55 - 45 or 55	Y	*Need sidewalk on both sides of Teal Lake & Ralph Stephens *Need stoplight *Countdown pedestrian signals *Makred crosswalks across Hwy 55 - large hatch *Reduce speed of Hwy 55 *Pedestrian refuge island
11	Sunset Lake Road	Wescott Ridge Road	Neighborhood Connection	Not good back towards Optimist Farm	N	Controlled Stop Signs	Y (on Sunset Fairway)	OK	N	N/A	N	N	Sidewalk on Wescott Ridge side of Sunset Lake Rd.; Sidewalk on Sunset	25 - Residential 45 - Sunset Lake	N	*Marked crosswalk *Advance warning signs and crossing lights *Reduce speed of Sunset Lake
12	Holly Springs Road	Bass Lake Road	Intersection	OK	N	Controlled Stop Light	Y	Average, could see some reduction	N	N/A	N	N	Sidewalk along south side of Holly Springs Rd.; sidewalk both sides	35 - Bass Lake 35 - Holly Springs	N	*Marked crosswalk *Add pedestrian countdown
13	Optimist Farm	Thorndale/Rosemary	Neighborhood Connection	Not good back towards Town	N	Controlled Stop signs	Y	OK	N	N/A	N	N	Sidewalk one side of Roseberry	25 - residential 45 - Optimist Farm	N	*Need sidewalk coming into intersection *Marked crosswalk over Optimist Farm *Advance warning signs and crossing lights *Reduce speed of Optimist Farm
14	Bass Lake Rd	Bass Lake Center	Neighborhood Connection to park	Not good, especially opposite the Town side	N	Uncontrolled	N	N	N	N/A	N	N	No sidewalk except some coming into park area	45 - Bass Lake	N	*Reduce speed of Bass Lake first *Marked crosswalk on Town side of park entrance (better sight distance) *Advance warning signs and crossing lights *Adjustments of pedestrian entrance, drainage, and landscaping coming into park *Mid-block crossing
15	Avent Ferry	Cass Holt	Neighborhood Connection to schools	Not good with curve	N	Controlled Stop Signs	N	Ok	N	N/A	N	N	No sidewalk; construction though along Cass Holt (school side)	45 - Avent Ferry 45 - Cass Holt	N	*Reduce speed of both roads first *Add stoplight (probably will be added) *Marked crosswalk all sides with stop light *Overhanging flashing speed reduction in school zone *Pedestrian - school signage
16	Bass Lake Rd	New development at Brook Manor	Neighborhood Connection to pool across Bass Lake	OK	-	-	-	-	-	-	-	-	No sidewalk and development construction just beginning	45 - Bass Lake	N	No development yet, but when development occurs: *Marked crosswalk *Advance warning signs and crossing lights *Reduce speed of Bass Lake

Intersection Improvements





Greenway Prioritization

Legend

- Proposed Grade Sep. Pedestrian Crossing
- Existing Grade Sep. Pedestrian Crossing
- Top Priority Greenway Project
- Medium/Long Term Greenway Project
- Existing Greenway
- Existing Sidewalk
- Road
- NC 55 Bypass
- I-540 - Future Corridor
- Town Boundary
- School
- Park/Recreation Facility
- Business Park
- Lake

1 Miles

N
W E
S

Table C.1

On-Road Cost Estimate

Primary Pedestrian Corridors	From	To	Phase	Length of Segment (ft)	Existing Sidewalk (ft)	Cost per Sq. Foot*	Min. Width (ft)	Estimated Cost**
Avent Ferry Road	Cass Holt	NC 55 BYP	Short-Term	5572	0	$9	5	$501,480
Avent Ferry Road	Longbottom	Cass Holt	Short-Term	6065	0	$9	5	$545,850
Avent Ferry Road	NC 55 BYP	Center	Short-Term	3761	500	$9	5	$315,990
Ballentine	Raleigh	Bottleneck	Medium-Term	2567	2627	$9	5	$112,815
Ballentine	Bottleneck	Irving	Medium-Term	3437	1230	$9	5	$253,980
Bass Lake Road	Holly Springs	Olde Mills Bluff	Short-Term	9082	835	$9	5	$779,805
Bass Lake Road	Olde Mills Bluff	Sunset Lake	Medium-Term	8921	0	$9	5	$802,890
Briarglen	Bass Lake	Mistyridge	Long-Term	2275	0	$9	5	$204,750
Broad	Old Adams	End/Future Ext.	Long-Term	1705	0	$9	5	$153,450
Burt	Earp	New Hill	Long-Term	629	0	$9	5	$56,610
Cass Holt	Rouse	Avent Ferry Road	Medium-Term	11080	0	$9	5	$997,200
Earp	Raleigh	Bass Lake	Short-Term	2705	2705	$9	5	$121,725
Earp	Burt	Raleigh	Medium-Term	2179	554	$9	5	$171,180
Elm	Ballentine	Grigsby	Medium-Term	3250	0	$9	5	$292,500
Grigsby	Raleigh	Fair Ground	Medium-Term	4302	2309	$9	5	$283,275
Grigsby	Fair Ground	End/Future Ext.	Long-Term	3121	1705	$9	5	$204,165
Holly Springs Road	Main Street	Bass Lake	Short-Term	3058	2410	$9	5	$166,770
Holly Springs Road	Bass Lake	Linksland	Short-Term	4285	3467	$9	5	$229,635
Holly Springs Road	NC 55 BYP	Main Street	Short-Term	4442	545	$9	5	$375,255
Holly Springs Road	Linksland	Sunset Lake	Medium-Term	5076	654	$9	5	$427,410
Holly Springs Road	Sunset Lake	Holly Run	Long-Term	5375	970	$9	5	$440,100
Honeycut	Cass Holt	Piney Grove Wilbon	Long-Term	4557	0	$9	5	$410,130
Irving	Ballentine	New Hill	Long-Term	2380	0	$9	5	$214,200
Main Street	Springstone	Holly Springs	Short-Term	3117	1844	$9	5	$197,550
Main Street	Holly Springs	Elm	Short-Term	3087	1860	$9	5	$194,130
Main Street	Arbor Creek	Springstone	Medium-Term	4270	1188	$9	5	$330,840
Main Street	Elm	NC 55 BYP	Medium-Term	2589	0	$9	5	$233,010
Main Street	NC 55 BYP	Arbor Creek	Long-Term	7394	2636	$9	5	$546,840
Main Street	Ralph Stevens	Old Adams	Long-Term	2899	0	$9	5	$260,910
NC 55	Avent Ferry Road	Ralph Stevens	Long-Term	2250	0	$9	5	$202,500
New Hill Road	Old Apex Road	Town Boundary	Long-Term	6457	0	$9	5	$581,130
New Hill Road	NC 55 BYP	Old Apex Road	Long-Term	1867	0	$9	5	$168,030
Old Adams	Main Street	End/Future Ext.	Long-Term	2394	0	$9	5	$215,460
Old Holly Springs/Apex	New Hill Road	Woodscreek	Long-Term	8474	0	$9	5	$762,660
Old Smithfield	NC 55 BYP	Main Street	Long-Term	2240	0	$9	5	$201,600
Optimist Farm	Sunset Lake	Roseberry	Long-Term	3626	0	$9	5	$326,340
Optimist Farm	Roseberry	Lamm	Long-Term	2830	0	$9	5	$254,700
Piney Grove Wilbon	Honeycut	Avent Ferry Road	Medium-Term	7337	0	$9	5	$660,330
Raleigh Road	Main Street	Holly Springs	Short-Term	2371	1261	$9	5	$156,645
Ralph Stephens	Teal Lake	Main Street	Long-Term	5220	0	$9	5	$469,800
Stephenson	Sunset Lake	Rhythm	Long-Term	5746	0	$9	5	$517,140
Stinson	Bass Lake	End	Long-Term	970	1632	$9	5	$13,860
Stinson	Grigsby	End	Long-Term	3282	3058	$9	5	$157,770
Sunset Lake	Main Street	Stephenson	Long-Term	7903	0	$9	5	$711,270
Sunset Lake	Stephenson	Holly Springs	Long-Term	5543	4598	$9	5	$291,960
Sunset Lake	Holly Springs	Brackenridge	Long-Term	9268	3424	$9	5	$680,040
Sunset Lake	Brackenridge	Bass Lake	Long-Term	6629	0	$9	5	$596,610
Woodscreek	Woodfield	Old Apex Road	Long-Term	4988	0	$9	5	$448,920
							Total:	**$17,241,210**

**Costs are only for construction, doesn't include ROW or utility easement relocation*

***Calculated by the following (Segment Length x 2) - (Existing Sidewalk in Segment) x (Cost Per Sq. Foot) x (Minimum Width);*

Table C.2

Greenway Cost Estimate

Greenway Corridor	From	To	Length of Segment (ft)	Cost per Mile	Min. Width (ft)	Estimated Cost*
Bass Lake Loop Greenway Completion	End of Existing Trail	Park Facilities	3280	$350,000	10	$217,424
Central Spine Greenway	Middle Creek	Earp Road	8635	$350,000	10	$572,396
Holly Springs Road	Village District Area	NC 55 Bypass/Existing Gwy	4320	$350,000	10	$286,364
Middle Creek Greenway	Sunset Lake	Main Street	17560	$350,000	10	$1,164,015
North Main Street Rail-Trail	Anchor Creek Way	NC 55 Bypass	9150	$350,000	10	$606,534
Utley Creek Greenway	Holly Glen	NC 55 Bypass	9550	$350,000	10	$633,049
Utley Creek Greenway Spur	Utley Creek Greenway	Holly Springs Business Park	7050	$350,000	10	$467,330
VDAP to Bass Greenway	Village District Area	Bass Lake Park	10150	$350,000	10	$672,822
Village District Area Greenways	Downtown	Neighborhoods	11111	$350,000	10	$736,525
Womble Park Greenway Connectors	In Park	Neighborhoods	5480	$350,000	10	$363,258
Womble-Bass Greenway	Womble Park	Bass Lake Park	4600	$350,000	10	$304,924
					Total:	**$6,024,640**

**Calculated by the following (Segment Length/5280) x (Cost Per Mile)*

Prioritization Matrix

Primary Pedestrian Corridors	From	To	Direct Access to a School Elem. School Proximity (1/2 mile radius)	Middle School Proximity (1/2 mile radius)	High School Proximity (1/2 mile radius)	Parks/Rec/Playgrounds (1/2 mile radius)	Direct Access to/from an Existing Greenway	Direct Access to/from Higher Density Residential Areas	Direct Access to/from Future Development	Connections to the Downtown District or Central Business Zoning	Direct Access to/from Zoned Areas*	Regional & Citywide Connections	Connectivity to Existing Sidewalks	Direct Access to/from a Proposed Greenway	Top Suggestions from Public Input Process	Priority Score Total
			5	4	3	3	3	3	2	2	3	2	2	2	1	4	39
Holly Springs Road	Main Street	Bass Lake	5	4	3	3	3	0	2	2	3	2	0	2	1	4	34
Avent Ferry Road	Cass Holt	NC 55 BYP	5	4	0	3	0	0	2	2	0	2	2	2	1	4	27
Holly Springs Road	Bass Lake	Linksland	5	4	3	0	3	0	0	2	0	2	0	2	1	4	26
Main Street	Springstone	Holly Springs	5	4	0	3	3	0	0	0	3	2	0	2	0	4	26
Avent Ferry Road	Longbottom	Cass Holt	5	4	0	3	3	0	0	0	0	2	2	0	1	4	24
Avent Ferry Road	NC 55 BYP	Earp	0	4	0	3	3	0	0	0	3	2	2	2	1	4	24
Holly Springs Road	NC 55 BYP	Main Street	0	4	0	3	3	0	0	0	3	2	2	2	1	4	24
Bass Lake Road	Holly Springs	Olde Mills Bluff	0	4	3	0	3	0	2	2	0	0	2	2	1	4	23
Earp	Raleigh	Bass Lake	0	4	3	3	3	0	2	0	3	2	0	2	1	0	23
Main Street	Holly Springs	Elm	0	4	0	3	3	0	0	0	3	2	0	2	1	4	22
Raleigh Road	Main Street	Holly Springs	0	4	0	3	3	0	0	0	3	2	0	2	1	4	22
Cass Holt	Rouse	Avent Ferry Road	5	4	0	3	0	0	0	0	0	2	2	2	1	0	19
Earp	Burt	Raleigh	0	4	0	3	3	0	0	0	3	2	0	2	1	0	18
Grigsby	Raleigh	Fair Ground	0	0	0	0	3	3	0	0	3	2	0	2	1	4	18
Main Street	Arbor Creek	Springstone	0	0	0	3	3	0	2	0	0	2	0	2	1	4	17
Main Street	Elm	NC 55 BYP	0	0	0	0	3	0	2	0	3	2	2	0	1	4	17
Elm	Ballentine	Grigsby	0	0	0	0	3	3	2	0	3	2	0	2	1	0	16
Holly Springs Road	Linksland	Sunset Lake	0	4	3	0	0	0	0	0	0	2	0	2	1	4	16
Piney Grove Wilbon	Honeycut	Avent Ferry Road	0	4	0	3	0	0	2	2	0	2	2	0	1	0	16
Ballentine	Raleigh	Bottleneck	0	0	0	0	3	3	0	0	3	2	0	2	1	0	14
Grigsby	Fair Ground	End/Future Ext.	0	0	0	0	3	3	0	0	0	0	0	2	1	4	13
Main Street	NC 55 BYP	Arbor Creek	0	0	0	0	0	0	2	0	0	2	2	2	1	4	13
Stinson	Bass Lake	End	0	4	3	0	3	0	0	0	0	0	0	2	1	0	13
Main Street	Ralph Stevens	Old Adams	0	0	0	0	3	0	0	0	0	2	2	0	1	4	12
Sunset Lake	Main Street	Stephenson	0	0	0	0	0	3	2	0	0	0	2	0	1	4	12
Holly Springs Road	Sunset Lake	Holly Run	0	0	0	0	0	0	0	0	0	2	2	2	1	4	11
Stinson	Grigsby	End	0	0	0	0	3	0	0	0	3	2	0	2	1	0	11
Sunset Lake	Stephenson	Holly Springs	0	0	0	0	0	0	0	0	0	2	2	2	1	4	11
Sunset Lake	Holly Springs	Brackenridge	0	0	0	0	0	0	0	0	0	2	2	2	1	4	11
Bass Lake Road	Olde Mills Bluff	Sunset Lake	0	0	0	0	3	0	0	0	0	0	2	0	1	4	10
Burt	Earp	New Hill	0	0	0	3	3	0	0	0	3	0	0	0	1	0	10
NC 55	Avent Ferry Road	Ralph Stevens	0	0	0	0	3	0	2	0	0	2	2	0	1	0	10
Ballentine	Bottleneck	Irving	0	0	0	0	3	0	0	0	0	2	2	2	0	0	9
New Hill Road	Old Apex Road	Friendship Road	0	0	0	0	0	0	2	2	0	2	2	0	1	0	9
Ralph Stephens	Teal Lake	Main Street	0	0	0	0	3	0	0	0	0	2	2	0	1	0	8
New Hill Road	NC 55 BYP	Old Apex Road	0	0	0	0	0	0	2	0	0	2	2	0	1	0	7
Old Holly Springs/Apex	New Hill Road	Woodscreek	0	0	0	0	0	0	2	0	0	2	2	0	1	0	7
Sunset Lake	Brackenridge	Bass Lake	0	0	0	0	0	0	0	0	0	0	2	0	0	4	6
Optimist Farm	Sunset Lake	Roseberry	0	0	0	0	0	0	0	0	0	2	2	0	1	0	5
Optimist Farm	Roseberry	Lamm	0	0	0	0	0	0	0	2	0	0	2	0	0	0	4
Briarglen	Bass Lake	Mistyridge	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Irving	Ballentine	New Hill	0	0	0	0	0	0	0	0	0	2	0	0	1	0	3
Old Smithfield	NC 55 BYP	Main Street	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3
Woodscreek	Woodfield	Old Apex Road	0	0	0	0	0	0	0	0	0	0	2	0	1	0	3
Broad	Old Adams	End/Future Ext.	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Stephenson	Sunset Lake	Rhythm	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Honeycut	Cass Holt	Piney Grove Wilbon	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Old Adams	Main Street	End/Future Ext.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0